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Compilation of geochronological data for Cenozoic volcanic activity on the African plate and for selected Northern African sedimentary basins

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REPORT

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Compilation of geochronological data for Cenozoic volcanic activity on the African plate and for selected Northern African sedimentary basins

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Summary:
A compilation of published isotope geochronological data for Cenozoic volcanic / magmatic activity on the African plate and for part of the adjacent Antarctic plate was created within The African Plate project (TAP; collaboration between NGU and Statoil). This compilation covers the continental as well as the oceanic part of the African plate. Areas with documented recent or historic volcanic or magmatic activity are also included. In addition, geochronological data for selected Northern African sedimentary basins (Tadouenni, Kufra, Murzuq, Illizi, Sirte) were included. The vast majority of these data are from surface outcrops in areas immediately adjacent to these basins, rather than from the basins themselves (where few published isotope ages exist). Published data included in this database are obtained from the following isotope geochronological methods: Ar/Ar, K/Ar, Re/Os, Rb/Sr, Sm/Nd, Lu/Hf, FT, U/Pb, Pb/Pb and U-Th/Pb. Details on laboratory methodologies, age statistics, etc., are included as much as possible. For the Cenozoic volcanics a subdivision into alkaline and non-alkaline rocks was made following a broad definition by Woolley (2001) as well as a much more narrow definition by Kevin C. Burke (including only nephelinite, nepheline syenite, phonolite and sövite).

Keywords: geochronology	Volcanic rocks	Africa
Cenozoic	sedimentary basin	isotope
alkaline		

CONTENTS

1. Introduction
2. Field names in the Microsoft Access Database
3. Geochronological database for Cenozoic volcanic and magmatic events
4. Geochronological database for selected Northern African basins
    4.1Taoudenni basin
    4.2Al Kufra, Murzuk, Illizi and Sirte basins
5. References (269)

FIGURES

Figure 1. Volcanics younger than 30 Ma on the African plate and part of the adjacent Antarctic plate. Red line representing the 1% slow shear wave velocity boundary at the Core-Mantle Boundary
Figure 2. Northern African basins selected for inclusion in the geochronology database
Figure 3. Crystalline basement ages (incl. Pan-African) for the Taoudenni basin area
Figure 4. Histogram for crystalline basement ages (incl. Pan-African) for the Taoudenni basin area
Figure 5. Central Atlantic Magmatic Province (CAMP) ages in the Taoudenni basin area
Figure 6. Late Hercynian metamorphic ages of the Mauritanides
Figure 7. Histogram of metamorphic ages of the Southern and Northern Mauritanides
Figure 8. Histogram of crystalline basement ages in the region encompassing the Al Kufra, Illizi, Sirte and Murzuk basins.
Figure 9. Sample locations for crystalline basement ages in the region encompassing the Al Kufra, Illizi, Sirte and Murzuk basins.
Figure 10. Southeastern section of the Al Kufra basin (Sudan)
Figure 11. Cenozoic volcanics in the Al Kufra, Illizi, Sirte and Murzuk basin area.

TABLES

None

APPENDIX

Electronic supplement; TAPgeochronARC.accdb
(Microsoft Access Database; single table)

1. INTRODUCTION

The database of isotope geochronological data described here consists of two parts: (1) Cenozoic volcanic and magmatic activity on the entire African plate as well as on part of the adjacent Antarctic plate, and (2) data available for the region encompassing the following Northern African basins: Taoudenni, Al Kufra, Murzuk, Illizi and Sirte.

The database of Cenozoic volcanic – magmatic activity includes virtually all sites on the African plate as well as on part of the adjacent Antarctic plate for which volcanic and / or magmatic activity during the last 65 Ma has been reported. The primary reason to include also data from part of the adjacent Antarctic plate is that the Plume Generation Zone (PGZ; Burke et al. 2008a) extends below the Antarctic plate. One of the goals of the TAP project was to investigate a possible link between Cenozoic African volcanic activity and the PGZ, similar to the link found between the large igneous provinces of the last 300 Ma and the PGZ. We make no a-priori selection based on characteristics such as 'hotspot' related volcanism, rift-related activity, anorogenic magmatism, etc. This Cenozoic part of our database includes over 2500 reported ages. These ages have been determined by the $^{40}Ar/^{39}Ar$ method (N = ~500), the K/Ar method (N = ~1900) or other methods such as U/Pb, Rb/Sr, etc (N = ~100 all together). For a number of areas a large amount of age determinations is available, such as for example for the Canary Islands, Cape Verde and the East African Rift Valley in Kenya and Ethiopia. For several other known volcanic centres far fewer ages are available, such as for example those located in Chad and Sudan.

The 2nd part of the database covers geochronological data available for the region encompassing the Taoudenni, Al Kufra, Murzuk, Illizi and Sirte basins. However, the vast majority of published data are from surface outcrops in areas immediately adjacent to these basins, rather than from the basins themselves. Published data (~900 ages) included in this database are obtained from the following geo-chronological methods: Ar/Ar, K/Ar, Re/Os, Rb/Sr, Sm/Nd, Lu/Hf, FT, U/Pb, Pb/Pb and U-Th/Pb.

A lot of data were first published from the 1960s to 1980s. References to age data in many more recent publications turned out not to be pointing towards these original sources, but to overview papers, geological reviews, etc. The references in the current database are almost exclusively taken from the original sources. It is inevitable, however, that a number of relevant data and references are missing, especially those reported in grey (not peer reviewed) literature.

The quality of the reported ages in both parts of the database is variable, both in terms of analytical precision as well as in, for example, details on sample locations, rock descriptions, etc. Ideally all age determinations would be by modern methodology such as 40Ar/39Ar or U/Pb. K/Ar dating, unlike its follow-up $^{40}Ar/^{39}Ar$ dating, lacks the capability to easily reveal post-eruption isotopic disturbances. However, the K/Ar ages included here are mostly for Cenozoic volcanics and these rocks typically have relatively simple cooling histories (without, for example, metamorphic thermal overprint). There is no obvious reason to expect *systematic* isotopic disturbances across large areas represented in the database. Also, for most known Cenozoic volcanic – magmatic occurrences multiple age determinations are available, so cross-checking these results provides a first level of quality control.

Because of the scale – both geographical and temporal – of our analysis (focussed on the entire African plate) shortcomings in the compilation, such as the lack of GPS coordinates for many datapoints or the use of now-outdated decay-constants, is considered non-critical. When

coordinates were lacking in the original publications, they were estimated based on geological maps included in the publications or for example by using published location maps together with Google Earth.

Descriptions of sample lithology in the references included in the database is often limited to simply a rock name. Nevertheless, this allows us to distinguish alkaline rocks (Sørensen 1974) and carbonatites (ARCs) from other rock types. We use two different definitions here to separate ARC from non ARC: a broad definition by Woolley (2001), which includes nepheline syenites, basanites, peralkaline syenite, quartz syenite, comendite, pantellerite, etc., and a more narrow definition by Kevin C. Burke, which strictly includes nephelinite, nepheline syenite, phonolite and sövite.

2. FIELD NAMES IN THE MICROSOFT ACCESS DATABASE

The electronic supplement to this report is a Microsoft Access database that can be easily linked (dynamically) to ArcGis. It includes the following field names, that will show up when using the 'identify' tool in ArcGis:

General datafields

Sample
Sample name taken from publication, or location name when no sample name was given in the reference
Input_order
Refers to order the data were entered into the database, internal use only
PlateID
Refers to EarthByte PlateIDs (101, North American Craton; 201, South American Craton; 301, Northern European Craton and Eurasia; 501, Indian Craton; 503, Arabia; 701, African Craton; 709, Somalia Plate; 802, Antarctica and East Antarctica; 820, Drake passage South, Scotia Sea)
Time0
Column of zeroes, included for internal use in Gplates reconstruction software only
Location
Location name as given in the reference
Lithology
Lithological name given in the reference
ARC_Woolley
'Yes' if site is included in Woolley (2001)
ARC_Burke_Ashwal
'Yes' if lithology is nephelinite, nepheline syenite, phonolite orsövite
Mineral
Specifies mineral phase dated, or whole rock where appropriate
Stratigraphic age
Stratigraphic age of sedimentary rock, as specfied in original publication
Elevation
Elevation in meters above sea level
Lat
Latitude in decimal degrees
Long
Longitude in decimal degrees
Coordinates
'Reported' when latitude and longitude were reported in the reference; 'Approximate' when latitude and longitude were found using location maps, geological maps, Google Earth, etc.
Method
Isotope geochronological method used in age determination
Age_on_map
Age in Ma to be used for plotting in ArcGis; copied over from the appropriate isotope age
1s_error_on_map
1σ error in Ma to be used for plotting in ArcGis; copied over from the appropriate isotope age error
Classification
Classification of reported age as metamorphic age, emplacement age, cooling age, retrogression age, etc; based on data description and interpretation in publication

U/Pb, Pb/Pb and U-Th-Pb age data

U/Pb, Pb/Pb, U-Th-Pb age

Reported age in Ma based on U/Pb, Pb/Pb or U-Th-Pb isotope system

U/Pb, Pb/Pb, U-Th-Pb 1s

Reported 1σ error in Ma based on U/Pb, Pb/Pb or U-Th-Pb isotope system

U/Pb, Pb/Pb, U-Th-Pb mswd

Mean square weighted deviation on isochron

Lu/Hf age data

Lu/Hf age

Reported age in Ma based on Lu/Hf isotope system

Lu/Hf age 1s

Reported 1σ error in Ma based on Lu/Hf isotope system

176Hf/177Hfi

Initial ^{176}Hf/^{177}Hf ratio

176Hf/177Hfi 1s

1σ error on initial ^{176}Hf/^{177}Hf ratio

Lu/Hf mswd

Mean square weighted deviation on isochron

Re/Os age data

187Os/188Os initial

Initial ^{187}Os/^{188}Os ratio

187Os/188Os initial 1s

1s error on ^{187}Os/^{188}Os ratio

Re-Os age

Re-Os age in Ma

Re-Os error

1σ error on Re-Os age in Ma

Re-Os MSWD

Mean square weighted deviation on isochron

Rb/Sr age data

87Sr/86Sr0 (Rb/Sr)

Initial ^{87}Sr/^{86}Sr ratio

87Sr/86Sr0 1s (Rb/Sr)

1σ error on initial ^{87}Sr/^{86}Sr

MSWD Rb/Sr

Mean square weighted deviation on isochron

Isochron age, Rb/Sr

Rb/Sr age in Ma

Error 1s, Rb/Sr

1σ error on Rb/Sr age in Ma

Sm/Nd age data

Sm/Nd age

Reported Sm/Nd age in Ma

Sm/Nd 1s error

1σ error in Ma on Sm/Nd age

143Nd/144Ndi

Initial ^{143}Nd/^{144}Nd ratio

143Nd/144Ndi 1s
1σ error on initial $^{143}Nd/^{144}Nd$ ratio
Sm/Nd MSWD
Mean square weighted deviation on isochron

K/Ar age data
40Ar radiogenic (scc/g)
Standard cm^3 of ^{40}Ar per gram of sample material
40Ar radiogenic/40Ar total (%)
Radiogenic ^{40}Ar / ^{40}Ar total ratio in %
K2O%
Weighted percent of K_2O in sample material
Apparent age
Reported apparent K/Ar age in Ma
error
1σ error on reported K/Ar age in Ma

$^{40}Ar/^{39}Ar$ age data
Age
Reported $^{40}Ar/^{39}Ar$ age in Ma
Error 1s
1σ error on reported $^{40}Ar/^{39}Ar$ age in Ma
40Ar_39Ar_preferred_age_calculation_method
Specifies whether the reported $^{40}Ar/^{39}Ar$ age is a plateau age, weighted mean age or inverse isochron age
40Ar_39Arage_from_other_calculation_method
Specifies type of alternative calculation method, in case one was reported
Other_40Ar_39Arage_value
$^{40}Ar/^{39}Ar$ age in Ma from alternative calculation method, in case one was reported
Other_40Ar_39Arage_error_1s
1σ error on $^{40}Ar/^{39}Ar$ in Ma from alternative calculation method, in case one was reported
Percent39Ar_spectrum_age
Percentage of cumulative ^{39}Ar included in the preferred age calculation
40Ar36Ar_inverse_isochron_intercept
$^{40}Ar/^{36}Ar$ ratio for the intercept in the inverse isochron diagram
40Ar36Ar_inverse_isochron_intercept_1s_error
1σ error on the $^{40}Ar/^{36}Ar$ ratio for the intercept in the inverse isochron diagram
MSWD_ArAr
Mean square weighted deviation on inverse isochron

Fission track age data
rhoDx10e6/cm2
Track density in millions per square centimeter in the mica covering the dosimeter glass
ND
Number of tracks counted in the mica covering the dosimeter glass
rhoSx10e6/cm2
Spontaneous track density in millions per square centimeter in the etched sample
NS
Number of spontaneous tracks counted in the etched sample
rhoIx10e6/cm2
Induced track density in the mica covering the etched sample

NI
Number of induced tracks counted in the mica covering the etched sample
Dispersion
Degree of variability in a probability distribution, in %
P(X)2
Chi-squared probability of the fission track sample age
FTPage
Pooled fission track age in millions of years
FTPage_1s
1σ error on the pooled fission track age in millions of years
FTCage
Central fission track age in millions of years
FTCage_1s
1σ error on the central fission track age in millions of years
grains
Number of grains in which spontaneous tracks were counted
MTL
Mean track length of spontaneous fission tracks in microns
MTL 1s
1σ error on the mean track length of spontaneous fission tracks in microns
MTL SD
Standard deviation of the track length distribution of spontaneous fission tracks
No tracks
Number of tracks for which track length was measured
Dpar
Diameter of etch pit measured parallel to the crystallographic c-axis
Dpar SD
Standard deviation on the distribution of etch pit size measured parallel to the crystallographic c-axis

<u>Literature reference information, comment</u>
Interpretation, comment
Interpretation of the reported age in the referenced paper, including comment (where applicable)
Primary reference
Details of the reference in which data were originally reported
Secondary reference
Details of references that include citations papers not individually verified

3. GEOCHRONOLOGICAL DATABASE FOR CENOZOIC VOLCANIC & MAGMATIC EVENTS

This compilation includes all reported geochronological data on Cenozoic volcanic and magmatic events on the African plate and part of the adjacent Antarctic plate. Most of these data were obtained with the K/Ar method. Many of these datapoints are from the so-called volcanic swells (Burke et al. 2008a) on the African and Antarctic plates. When the locations of these volcanics are compared to the location of the so-called Plume Generation Zone (the 1% slow shear wave velocity boundary at the Core-Mantle Boundary, or Large Low Shear Velocity Provinces – LLSVP), it is apparent that there is a relationship between the two (Fig. 1). This relationship has previously been established for Large Igneous Provinces of the last 300 Ma (Burke et al. 2008b). Volcanic rocks related to opening of for example the Red Sea and the East African Rift Zone do not fit this pattern.

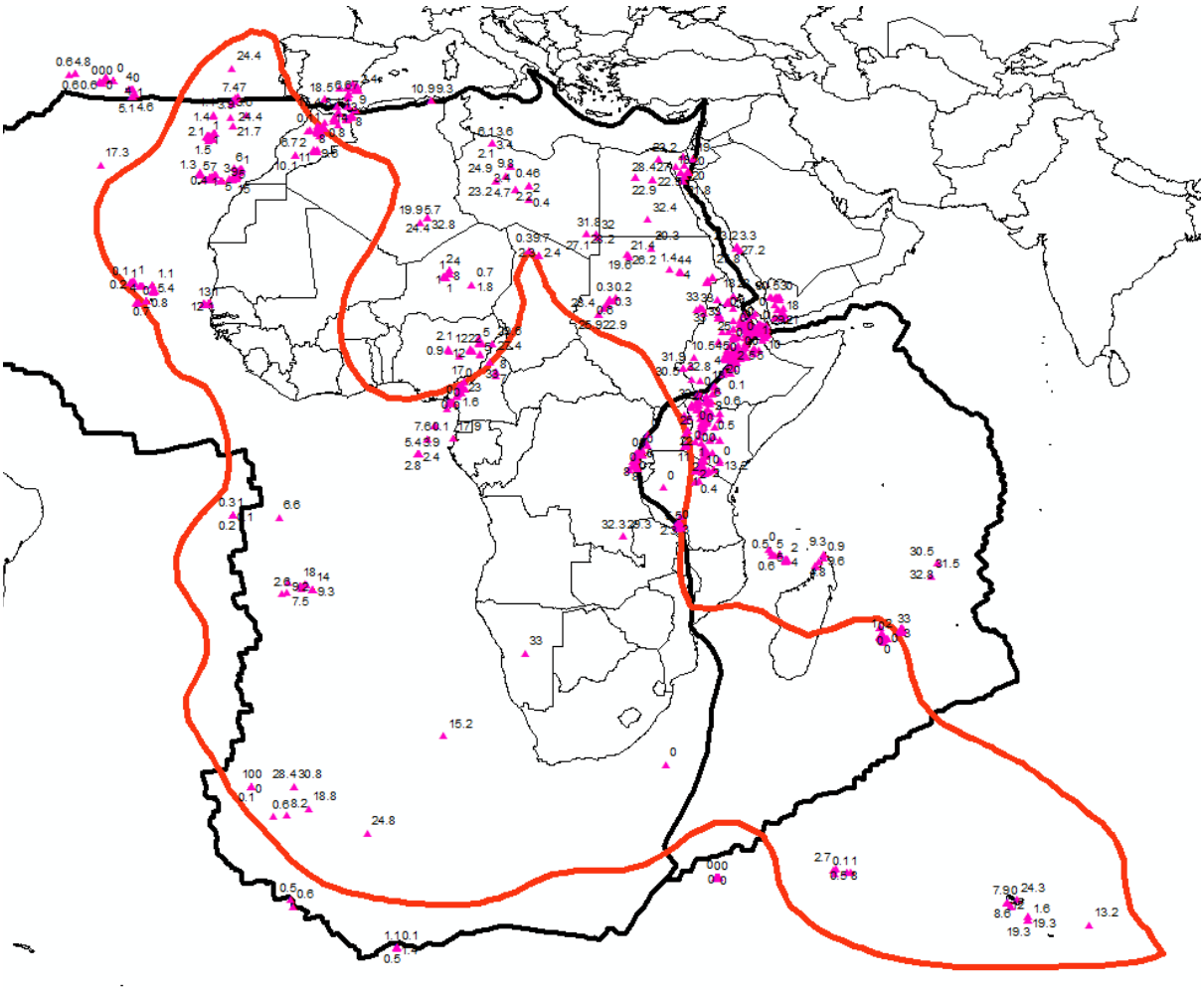

Figure 1. Volcanic rocks younger than 30 Ma on the African plate and part of the adjacent Antarctic plate. Red line representing the 1% slow shear wave velocity boundary at the Core-Mantle Boundary

To select Cenozoic volcanic and magmatic events from the MS Access database file the following query can be used in ARCgis:

Age_on_map <=65 AND Classification = 'Emplacement age'

To select alkaline rocks from this database (Woolley definition) the following query can be used:

Age_on_map <=65 AND Classification = 'Emplacement age' AND ARC_Woolley = 'ARC'

To select alkaline rocks from this database (Burke's narrow definition) the following query can be used:

Age_on_map <=65 AND Classification = 'Emplacement age' AND ARC_Burke_Ashwal = 'ARC'

4. GEOCHRONOLOGICAL DATABASE FOR SELECTED NORTHERN AFRICAN BASINS

The compilation at present includes geochronological data available for the following Northern African basins: Taoudenni, Al Kufra, Murzuk (Murzuq), Illizi and Sirte. Basin outlines in the accompanying figures are according to Hemsted, Geological Society, London, Special Publication, V207, 9 – 20 (2003).

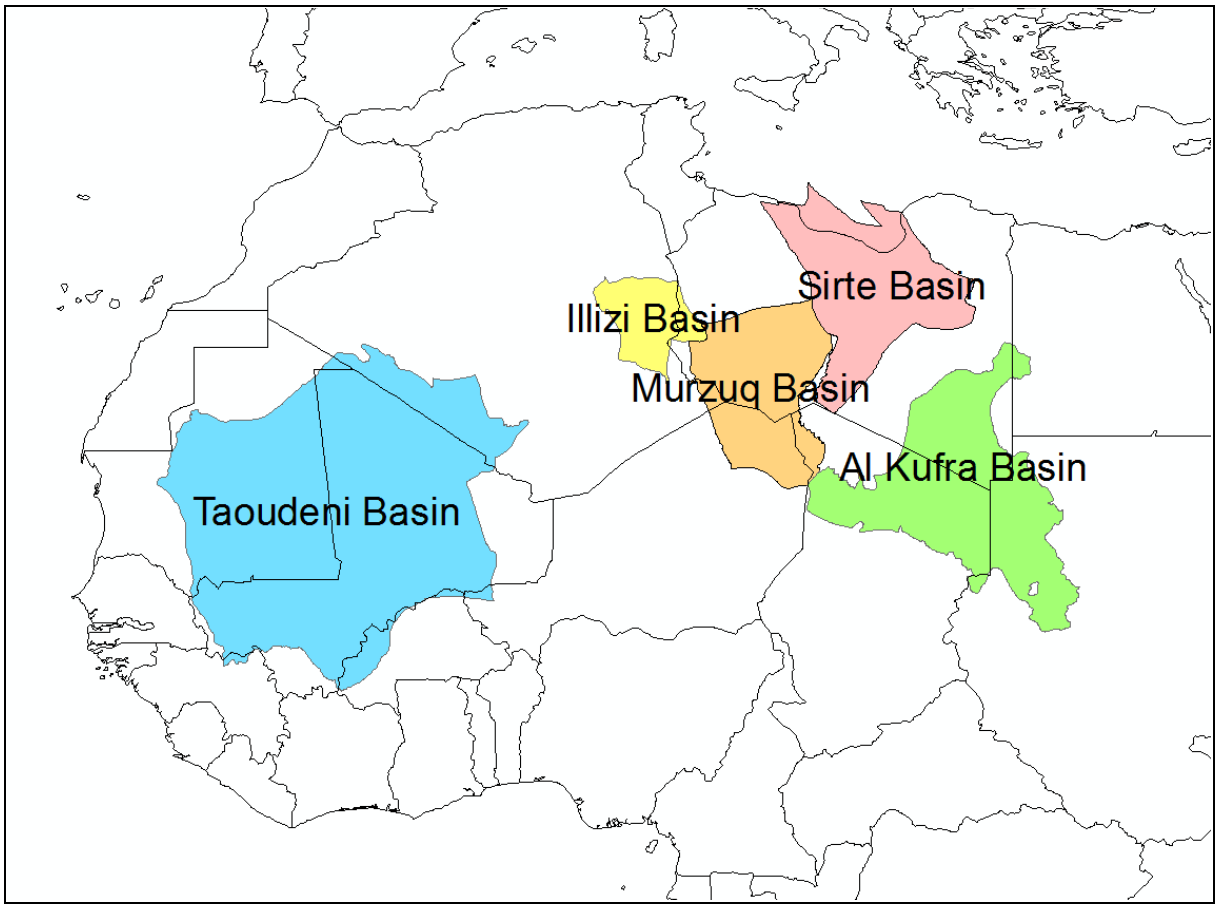

Figure 2. Northern African basins selected for inclusion in the geochronology database

4.1 TAOUDENNI BASIN

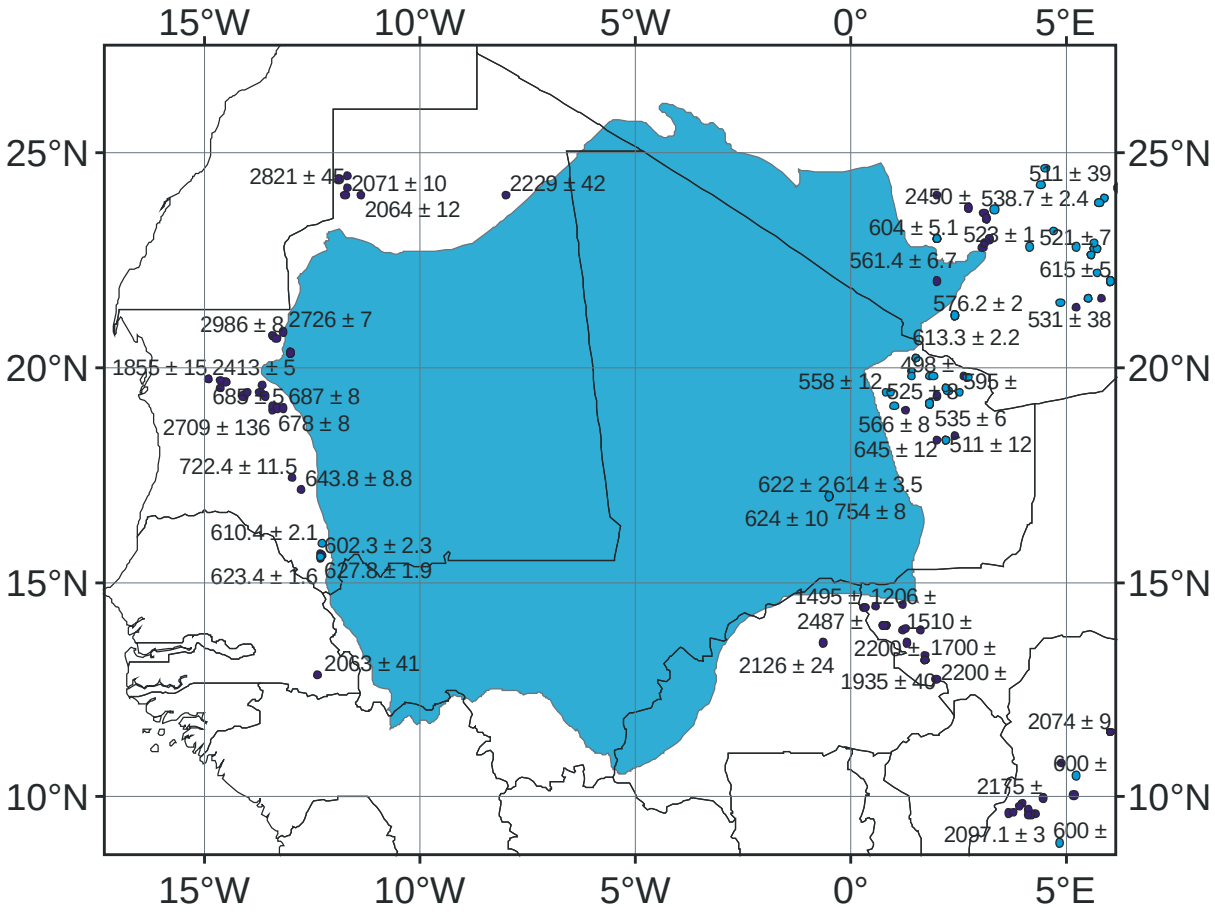

Figure 3. Crystalline basement ages (incl. Pan-African) for the Taoudenni basin area

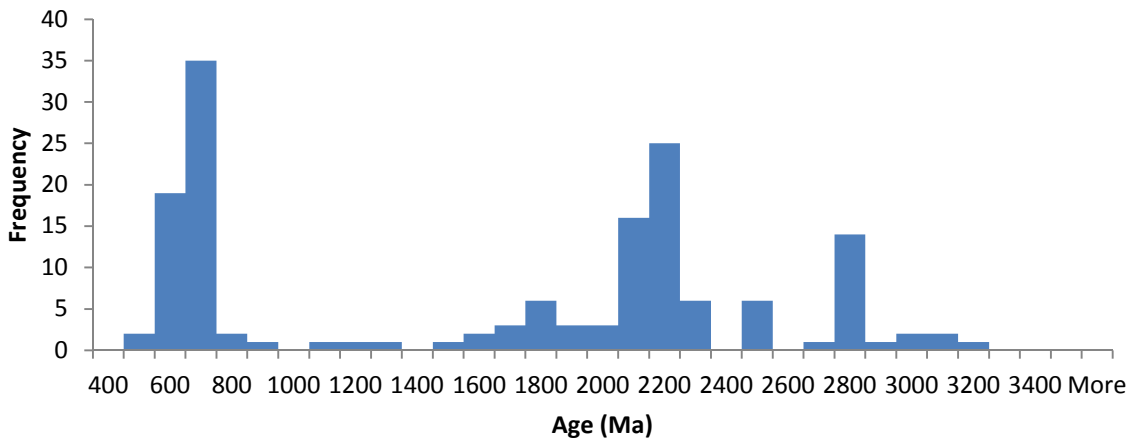

Figure 4. Histogram for crystalline basement ages (incl. Pan-African) for the Taoudenni basin area

Crystalline basement ages for the Taoudenni basin area mostly reflect 4 geological episodes. Archaean ages are found in the west, in Mauritania. Palaeoproterozoic Birimian ages are found all around the Taoudenni basin area, and ages indicating Eburnian rejuvenation at ~1.8 – 2.0 Ga are found everywhere where Birimian ages are found. Pan-African ages are found almost exclusively east of the Taoudenni basin area, in the Trans-Saharan belt.

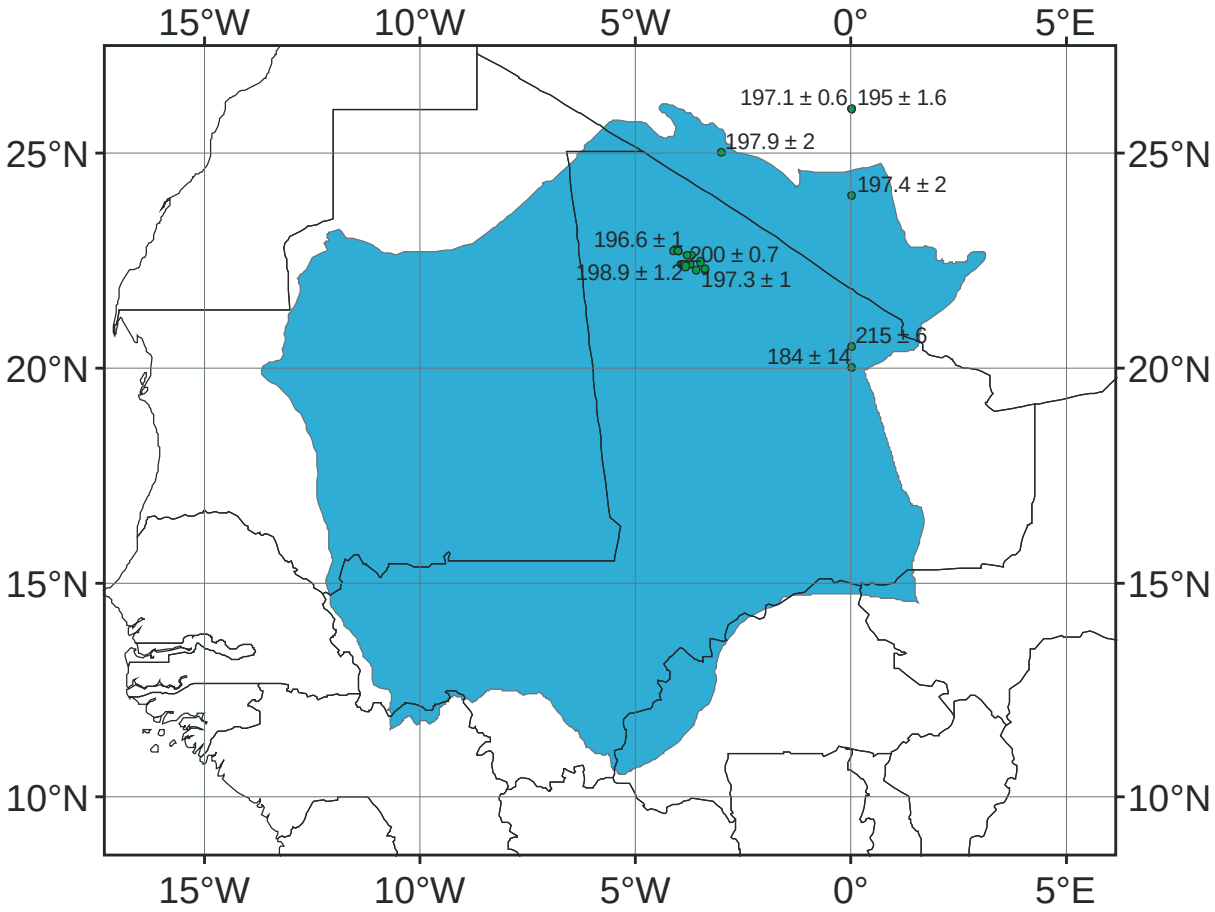

Figure 5. Central Atlantic Magmatic Province (CAMP) ages in the Taoudenni basin area

CAMP ages (intrusive at ~198 – 200 Ma) are reported for the northwestern part of Mali, along the border with Algeria. Basaltic lavas and sills assumed to be of CAMP age are also present in the northwestern part of the Taoudenni basin area, but no actual age constraints have yet been found.

Late Hercynian metamorphic ages are found along the western boundary of the Taoudenni basin area, in the Northern and Southern Mauritanide orogen (Fig. 6 and 7). The available ages here appear to represent two populations (330-300 Ma and 280-260 Ma). However, the number of ages are too few to conclude that these reflect two separate geological events, rather than a single, protracted metamorphic episode.

No Cenozoic volcanic rocks are found in the Taoudenni basin area.

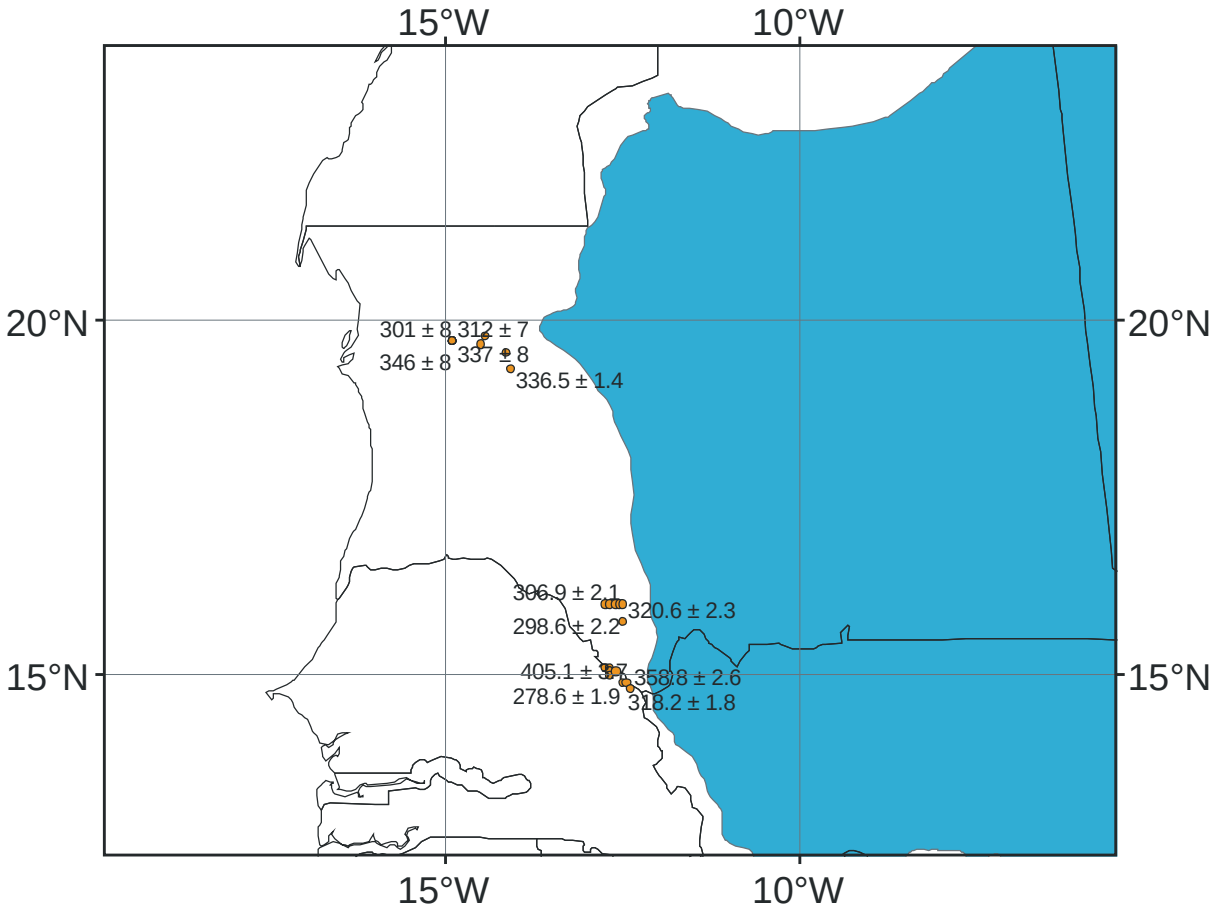

Figure 6. Late Hercynian metamorphic ages of the Mauritanides

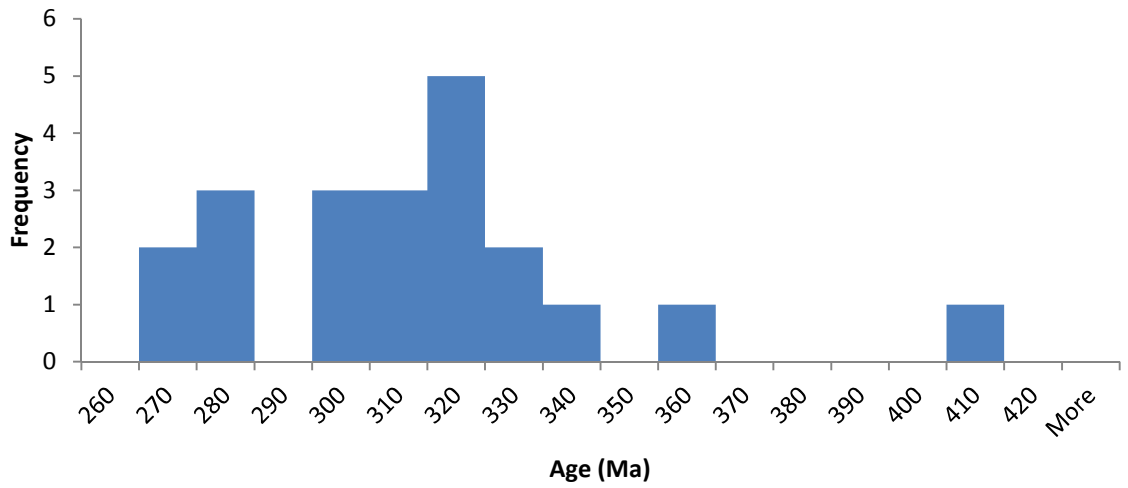

Figure 7. Histogram of metamorphic ages of the Southern and Northern Mauritanides

4.2 AL KUFRA, MURZUK, ILLIZI AND SIRTE BASINS

Crystalline basement ages in the area encompassing the Al Kufra, Murzuk, Illizi and Sirte basins reflect the same Paleoproterozoic episodes found in the Taoudenni basin area (Fig. 8). In addition, a significant number of Late Proterozoic ages are found in the Ahaggar region, Tibesti area and the Bayuda desert (0.8 Ga – 1.1 Ga). Pan-African ages are reported towards the west and southwest of the Illizi and Murzuk basins, in the Trans-Saharan belt (Fig. 9).

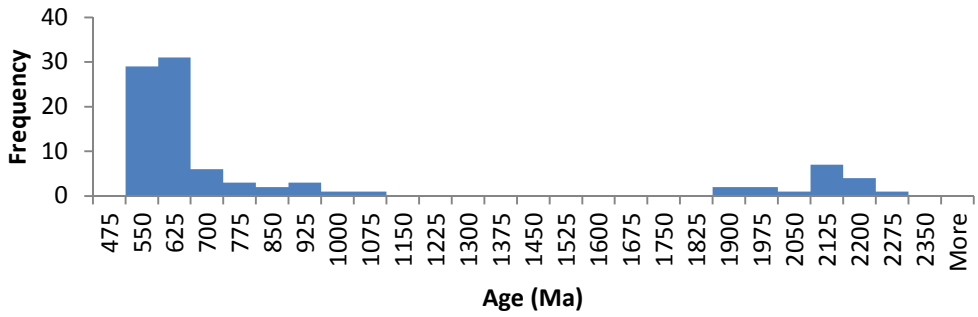

Figure 8. Histogram of crystalline basement ages in the region encompassing the Al Kufra, Illizi, Sirte and Murzuk basins.

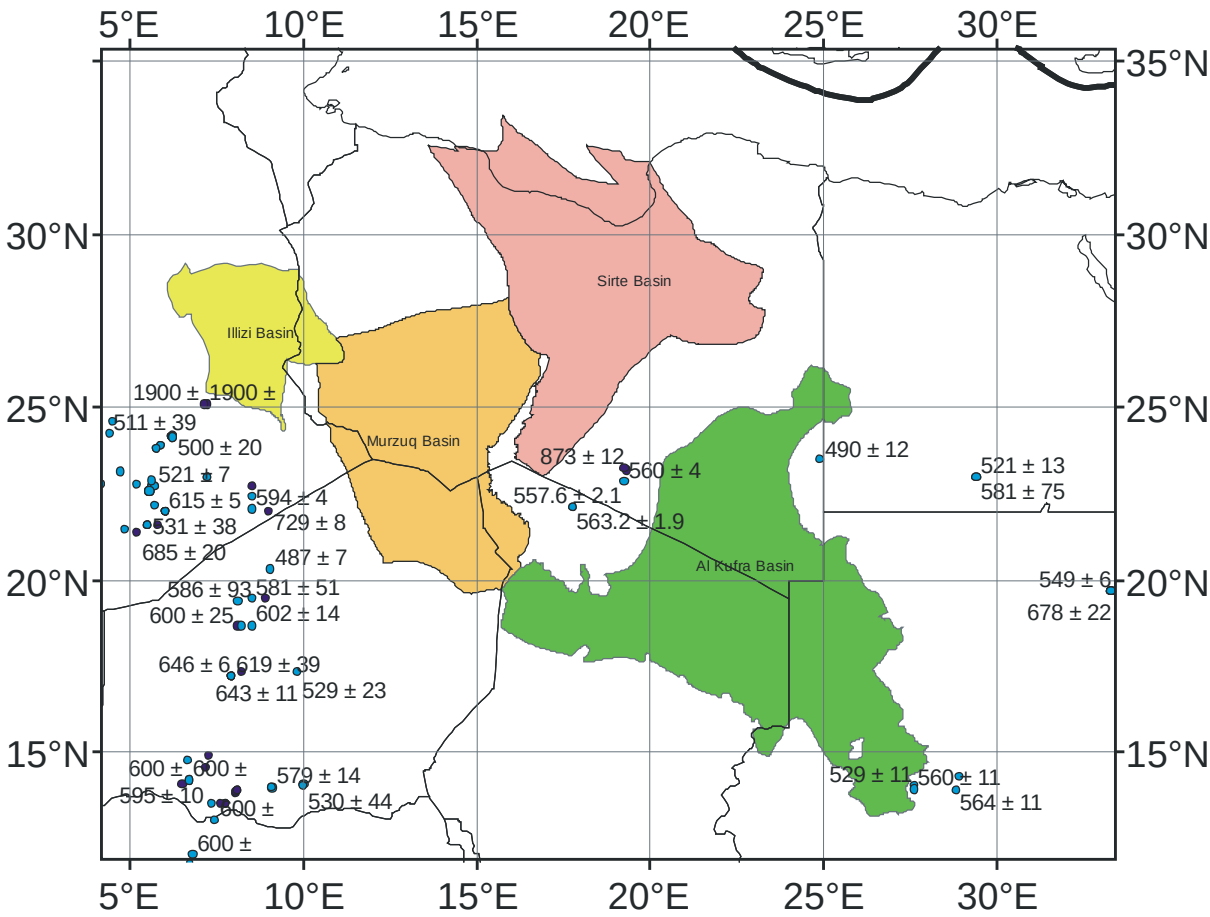

Figure 9. Sample locations for crystalline basement ages in the region encompassing the Al Kufra, Illizi, Sirte and Murzuk basins.

Post Pan-African ages in this region are mostly Cenozoic volcanic rocks. In addition, K-Ar ages from ring complexes and fault systems along the southeastern end of the Al Kufra basin are mostly Triassic, with some Jurassic ages nearby and some Permian ages further away (Fig. 10)

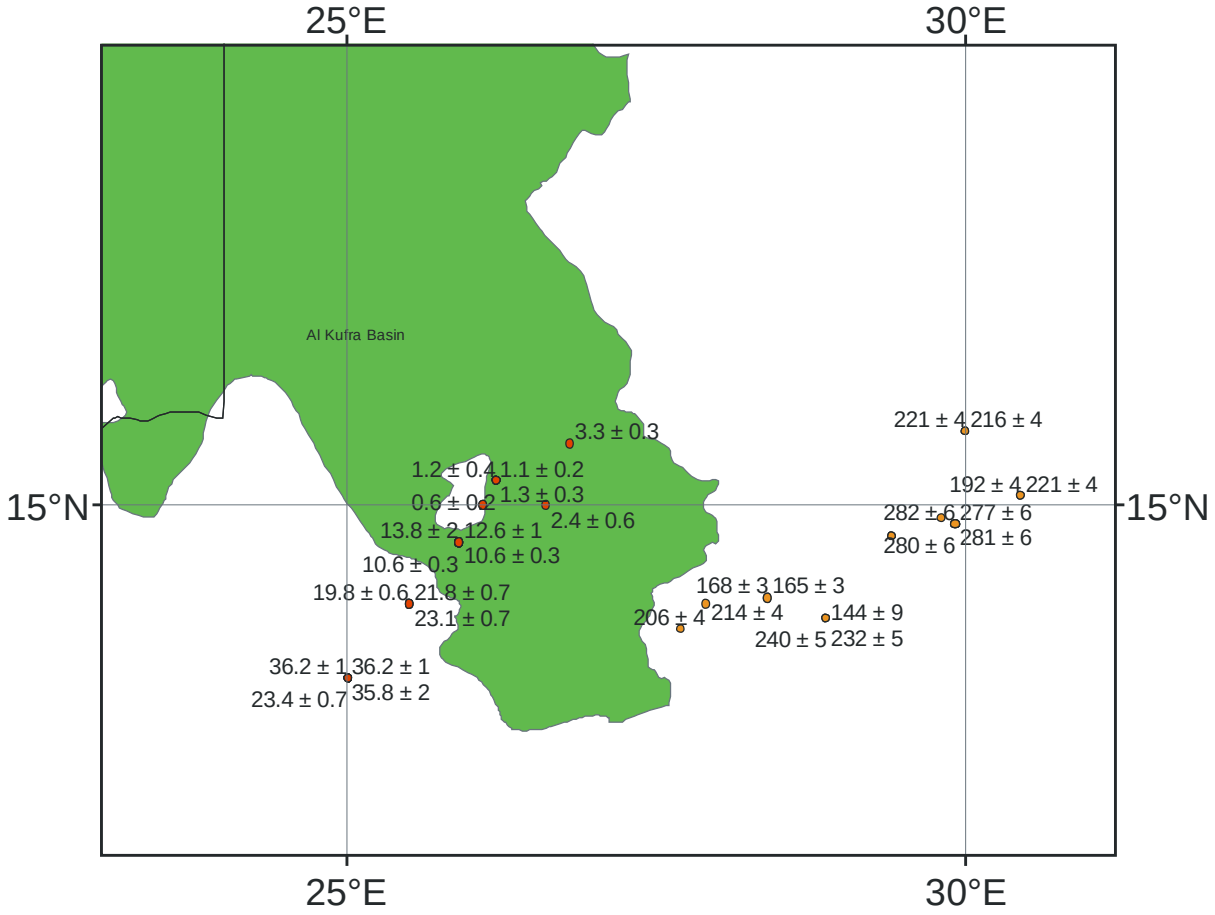

Figure 10. Southeastern section of the Al Kufra basin (Sudan)

Cenozoic volcanic rocks are found all around Al Kufra, Sirte, Illizi and Murzuk. The following ranges of ages have been reported (mostly K-Ar), see Fig. 10:
Garian: 2.1 – 6.1 Ma
Jebel Soda: 10.5 – 12.3 Ma
Al Haruj: 3.4 -10.2 Ma
Ahaggar: 24.4 – 44.0 Ma
Aïr: 0.8 – 1.8 Ma
Tibesti: 1.3 – 2.4 Ma
Uweinat: 37.9 – 54.0 Ma
Darfur: 0.6 – 35.8 Ma (and everything in between, generally increasing from NE-SW)
Laqia Arbain and Laqia: 19.6 – 26.2 Ma

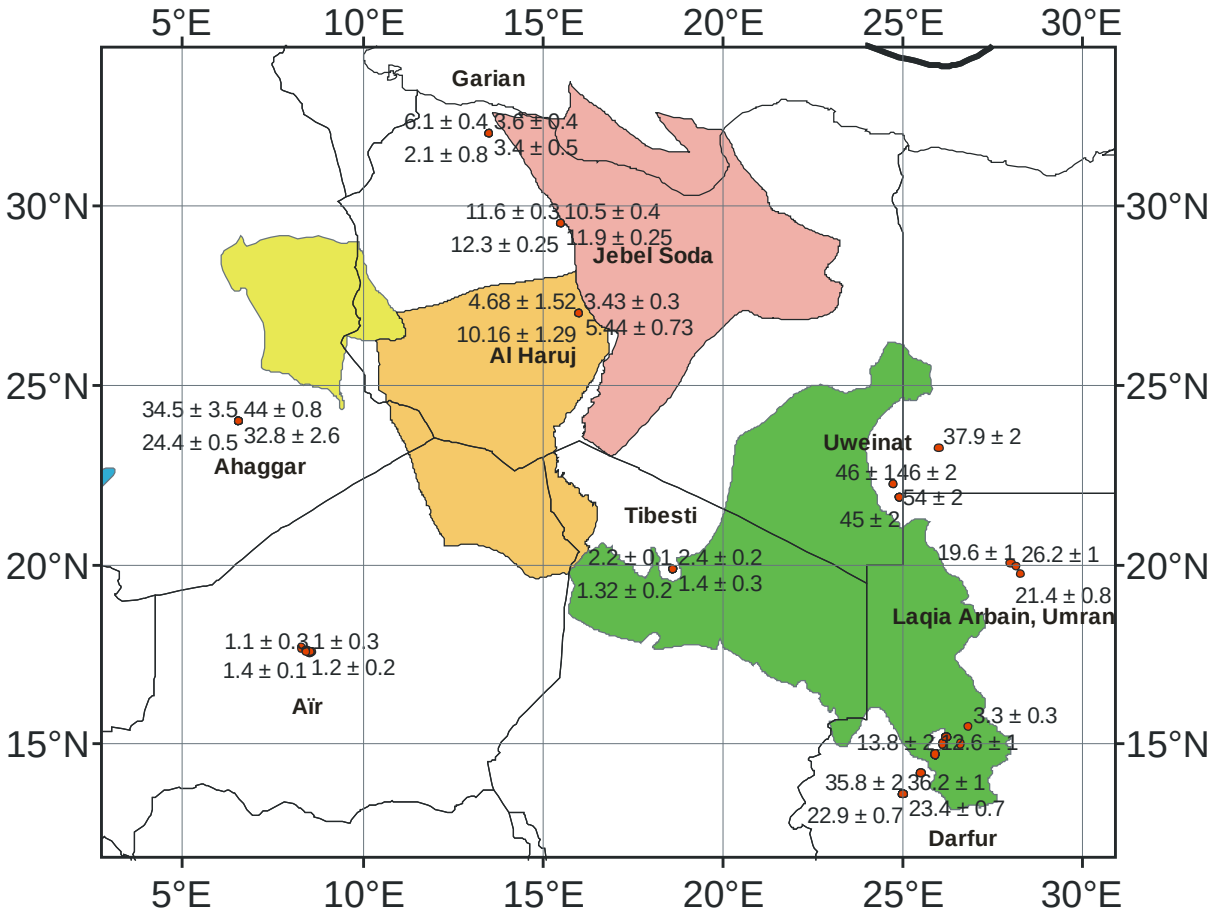

Figure 11. Cenozoic volcanics in the Al Kufra, Illizi, Sirte and Murzuk basin area.

The Cenozoic volcanic rocks (mostly 30 Ma and younger) found in Northern Africa are part of a much larger pattern of young volcanic rocks on the African plate, and even the Antarctic plate.

5. REFERENCES

Abdel-Monem, A.a., Fernandez, L.A. & Boone, G.M., K-Ar ages from the eastern Azores group (Santa Maria, Sao Miguel and the Formigas Islands, Lithos, V8, 247-254, 1975

Abouchami, W., Boher, M., Michard, A. & Albarede, F., A major 2.1 Ga event of magic magmatism in West Africa: an early stage of crustal accretion, Journal of Geophysical Research, V95, No B11, 17605-17629, 1990

Ade-Hall, J.M. et al., Geophysical studies of North African Cenozoic volcanic areas I: Haruj Assuad, Libya, Canadian Journal of Earth Sciences, V11, 998-1006, 1974

Ade-Hall, J.M., Gerstein, S., Gerstein, R.E., Reynolds, P.H., Dagley, P., Mussett, A.E. & Hubbard, T.P., Geophysical studies of North African Cenozoic Volcanic Areas: III. Garian, Libya, Canadian Journal of Earth Sciences, V12, 1264-1271, 1975

Ade-Hall, J.M., Reynolds, P.H., Dagley, P., Mussett, A.E. & Hubbard, T.P., Geophysical studies of North African Cenozoic Volcanic Areas: II. Jebel Soda, Libya, Canadian Journal of Earth Sciences, V12, 1257 - 1263, 1975

Ait-Hamou, F., et al., Nouvelles donnees geochronologiques et isotopiques sur le volcanisme cenozoique de l'Ahaggar (Sahara Algerien): des arguments en faveur de l'existence d'un panache, C.R. Acad. Sci.Paris., 829-836, 2000

Ait-Hamou, F., et al., Nouvelles donnees geochronologiques et isotopiques sur le volcanisme cenozoique de l'Ahaggar (Sahara Algerien): des arguments en faveur de l'existence d'un panache, C.R. Acad. Sci.Paris., V330, 829-836, 2000

Amelung, F. & Day, InSAR observations of the 1995 Fogo, Cape Verde, eruption: implications for the effects of collapse events upon island volcanoes, Geophysical Research Letters, V29, No12, 10.1029/2001GL013760, 2002

Ancochea, E. & Huertas, M.J., Age and composition of the Amanay seamount, Canary Islands, Marine Geophysical Researchers, V24, 161-169, 2003

Ancochea, E., Fuster, J.M., Ibarrola, E., Cendrero, A., Coello, J., Hernan, F., Cantagrel, J.M. & Jamond, C., Volcanic evolution of the island of Tenerife (Canary islands) in the light of new K-Ar data, Journal of Volcanology and Geothermal Reseach, V4, 231-249, 1990

Andriessen, P.A.M., Coolen, J.J.M.M.M. & Hebeda, E.H., K-Ar hornblende dating of late Pan-African metamorphism in the Furua granite complex of southern Tanzania, Precambrian Research, V30, 351-360, 1985

Armstrong, R.A., Master, S. & Robb, L.J., Geochronology of the Nchanga granite, and constraints on the maximum age of the Katanga supergroup, Zambian Copperbelt, Journal of African Earth Sciences, V42, 32-40, 2005

Ateba, B., et al., Eruptive and earthquake activities related to the 2000 eruption of Mount Cameroon volcano (West Africa), Journal of Volcanology and Geothermal Research, V179, 206-216, 2009

Attoh, K., Corfu, F. & Nude, P.M., U-Pb zircon age of deformed carbonatite and alkaline rocks in the Pan-African Dahomeyide suture zone, West Africa, Precambrian Research, V155, 251-260, 2007

Audin, L., et al., Palaeomagnetism and K-Ar and 40Ar/39Ar ages in the Ali Sabieh area (Republic of Djibouti and Ethiopia): constraints on the mechanism of Aden ridge propagation into SE Afar during the last 10 Myr, Geophys. J. Int., V158, 327-345, 2004

Azzouni-Sekkal, A., et al., The "Taourirt" magmatic province, a marker of the closing stage of the Pan-African orogeny in the Tuareg Shield: review of available data Sr-Nd isotope evidence, Journal of African Earth Sciences, V37, 331-350, 2003

Baker, B.H. & Miller, J.A., Geology and geochronology of the Seychelles islands and structure of the floor of the Arabian sea, Nature, V199, 346-199, 1963

Baker, I., Gale, N.H. & Simons, J., Geochronology of the St. Helena volcanoes, Nature, V215, 1451-1456, 1967

Baker, J., Snee, L. & Menzies, M., A brief Oligocene period of flood volcanism in Yemen: implications for the duration and rate of continental flood volcanism at the Afro-Arabian triple junction, Earth and Planetary Science Letters, V138, 39-55, 1996

Baldridge, W.S., Eyal, Y., Bartov, Y., Steinitz, G. & Eyal, M., Miocene magmatism of Sinai related to the opening of the Red Sea, Tectonophysics, V197, 181-201, 1991

Balestrieri, M.L., Abbate, E., Bigazzi, G. & El Bedri Ali, O., Thermochronological data from Sudan in the frame of the denudational history of the Nubian Red Sea margin, Earth Surface Processes and Landforms, V34, 1279-1290, 2009

Batumike, J.M., Griffin, W.L., Belousova, E.A., Pearson, N.J., O'Reill, S. & Shee, S.R., LAM-ICPMS U-Pb dating of kimberlitic perovskite: Eocene-Oligocene kimberlites from the Kundelungu Plateau, D.R. Congo, Earth and Planetary Science Letters, V267, 609-619, 2008

Belanteur, O., Bellon, H., Maury, R.C., Ouabadi, A., Coutelle, A., Semroud, B., Megartsi, M. & Fourcade, S., Le magmatisme miocene de l'Est Algerois, geologie, geochimie et geochronologie 40K/40Ar, C.R. Acad. Sci. Paris, t321, 489-496, 1995

Bellon, H. & Perthuisot, V., Ages radiometriques (K/Ar) de feldspaths potassiques et de micas neoformes dans le Trias de Tunisie septentrionale, Bull. Soc. Geol. France, t19, No5, 1179-1184, 1977

Bellon, H. & Perthuisot, V., Donnees radiometriques 40K-40Ar sur les mineraux potas. neoformes dans le Trias de la zone des nappes (Tunisie sept.): mise en evidence de phases thermiques cretacees et tertiaires, C.R. Acad. Sc. Paris, t296, 1539-1544,1983

Bellon, P.H. & Pouclet, A., Datations K-Ar de quelques laves du Rift-ouest de l'Afrique Centrale; implications sur l'evolution magmatique et structurale, Geologische Rundschau, V69, 49 - 62, 1980

Ben-Avraham, Z., Hartnady, C.J.H. & Le Roex, A.P., Neotectonic activity on continental fragments in the Southwest Indian Ocean: Agulhas Plateau and Mozambique Ridge, Journal of Geophysical Research, V100, B4, 6199-6211, 1995

Bernau, R., Darbyshire, D.P.F., Franz, G., Harms, U., Huth, A., Mansour, N., Pasteels, P. & Schandelmeier, H., Petrology, geochemistry and structural development of the Bir Safsaf-Aswan uplift, Southern Egypt, Journal of African Earth Sciences, V6, No1, 79-90, 1987

Berrahma, M., Delaloye, M., Faure-Muret, A. & Rachdi, H.E.N., Premières données géochronologiques sur le volcanisme alcalin du Jbel Saghro, Anti-Atlas, Maroc, Journal of African Earth Sciences, V17, No3, 333-341, 1993

Bertrand, H., et al., Alkaline volcano of Paleocene age on the Southern Guinean Margin: Mapping, petrology, 40Ar-39Ar laser probe dating, and implications for the evolution of the Eastern Equatorial Atlantic, Marine Geology, V114, 251-262, 2009

Bertrand, J.-M. & Davison, I., Pan-African granitoid emplacement in the Adrar des Iforas mobile belt (Mali): a Rb/Sr isotope study, Precambrian Research, V14, 333-361, 1981

Bertrand, J.-M., Michard, A., Boullier, A.-M. & Dautel, D., Structure and U/Pb geochronology of central Hoggar (Algeria): a reappraisal of its pan-African evolution, Tectonics, V5, No7, 955-972, 1986

Bertrand, J.M.L. & Lasserre, M., Pan-African and pre-Pan-African history of the hoggar (Algerian Sahara) in the light of new geochronological data from the Aleksod area, Precambrian Research, V3, 1976, 343 - 362

Black, R. & Liegeois, J.-P., Pan-African plutonism of the Damagaram inlier, Niger republic, Journal of African Earth Sciences, V13, 471-482, 1991

Blanc, A., et al., U-Pb dating and isotopic signature of the alkaline ring complexes of Bou Naga (Mauritania): its bearing on late Proterozoic plate tectonics around the West African Craton, Journal of African Earth Sciences, V14, 301-311, 1992

Boivin, P. & Bachelery, P., Petrology of 1977 to 1998 eruptions of Piton de la Fournaise, La Reunion island, Journal of Volcanology and Geothermal research, V184, 109-125, 2009

Bossiere, G. & Peucat, J.-J., Structural evidence and Rb/Sr, 39Ar-40Ar mica ages relationships for the existence of an Hercynian deep crustal shear zone in Grande Kabylie (Algeria) and its Alpine reworking, Tectonophysics, V121, 277-294, 1986

Bossiere, G., Bonkoungou, I., Peucat, J.-J. & Pupin, J.-P., Origin and age of Paleoproterozoic conglomerates and sandstones of the Tarkwaian Group in Burkina Faso, West Africa, Precambrian Research, V80, 153-172, 1996

Bosworth, W. & Maurin, A., Structure, geochronology and tectonic significance of the northern Suguta Valley (Gregory Rift), Kenya, Journal of the Geological Society, London, V150, 751-762, 1993

Bowden, P., Van Breemen, O., Hutchinson, J . & Turner, D.C., Palaeozoic and Mesozoic age trends for some ring complexes in Niger and Nigeria, Nature, V259, 297-299, 1976

Breemen, O. Van, Hutchinson, J. & Bowden, P., Age and Origin of the Nigerian Mesozoic Granites: a Rb-Sr isotopic study, Contribution toMineralogy and Petrology, V50, 1975, 157-172

Brown, W.L., Moreau, C. & Demaiffe, D., An anorthosite suite in a ring-complex: Crystallisation and emplacement of an anorogenic type from Abontorok, Air, Niger, Journal of Petrology, V30, 1501-1540, 1989

Bruguier, I., et al., Miocene incorporation of peridotite into the Hercynian basement of the Maghrebides (Edough massif, NE Algeria): Implications for the geodynamic evolution of the Western Mediterranean, Chemical Geology, V26, 172-184, 2009

Brunnschweiler, R.O., New K-Ar age determinations from the West African Shield in the Niger Republic, Geology, V2, 17-20, 1974

Burke, K., Steinberger, B., Torsvik, T.H. & Smethurst, M.A., Plume generation zones at the margins of Large Low Shear Velocity Provinces on the core-mantle boundary, Earth and Planetary Science Letters, V265, 49-60, 2008a

Burke, K. & Gunnell, Y., The African erosion surface: A continental-scale synthesis of geomorphology, tectonics, and environmental change over the past 180 million years, Geological Society of America Memoir 201, Boulder, Colorado, 2008b

Caby, R. & Andreopoulos-Renaud, U., Age U-Pb a 620 Ma d'un pluton synorogenique de l'Adrar des Iforas (Mali). Consequences pour l'age de la phase majeure de l'orogenese pan-africaine, C.R. Acad. Sci. Paris, t308, Serie II, 307-313, 1989

Caby, R. & Andreopoulos-Renaud, U., Le Hoggar Oriental, bloc cratonise a 730 Ma dans la chaine Pan-Africaine du nord du continent Africain, Precambrian Research, V36, 335-344, 1987

Caby, R. & Monie, P., Neoproterozoic subductions and differential exhumation of western Hoggar (southwest Algeria): new structural, petrological and geochronological evidence, Journal of African Earth Sciences, V37, 269-293, 2003

Caby, R., et al., Les phases tardives de l'orogenese Pan-Africaine dans l'Adrar des Iforas oriental (Mali): lithostratigraphie des formations molassiques et geochronologie U/Pb sur zircon de deux massifs intrusifs, Precambrian Research., V28, 187-199, 1985

Cantagrel, J.-M. & Karche, J.-P., Le volcanisme quaternaire du massif du Todgha (Air-Niger): etude geologique et geochronologique, Bull. Soc. Geol. France, No4, 557-562, 1983

Carpena, J., et al., Evidence of the contrasted fission-track clock behavior of the apatites from In Ouzzal carbonatites (northwest Hoggar): The low-temperature thermal history of an Archean basement, Geological Society of America Bulletin, V100, 1237-1243, 1988

Chabou, M.C., Sebai, A., Feraud, G. & Bertrand, H., Datation 40Ar/39Ar de la province magmatique de l'Atlantique central dans le Sud-Ouest algerien, C.R. Geoscience, V339, 970-978, 2007

Cheilletz, A., et al., Age de refroidissement de la croute juvenile birimienne d'Afrique de l'Ouest. Donnees U-Pb, Rb-Sr et K/Ar sur les formations a 2.1 Ga du SW-Niger, C.R. Acad. Sci. Paris., t319, 435-442, 1994

Cheilletz, A., et al., Geochimie et geochronologie Rb-Sr, K-Ar et 40Ar/39Ar des complexes granitiques pan-africains de la region de Tamanrasset (Algerie), Bull.Soc.Geol.France, t163, No6, 733-750, 1992

Chernet, T., Hart, W.K., Aronson, J.L. & Walter, R.C., New age constraints on the timing of volcanism and tectonism in the northern Main Ethiopian Rift-southern Afar transition zone (Ethiopia), J. Volcanology and Geothermal Research, V80, 267-280, 1998

Clauer, N., Dallmeyer, R.D. & Lecorche, J.P., Age of late Paleozoic tectonothermal activity in north-central Mauritanide, West Africa, Precambrian Research, V49, 97-105, 1991

Clauer, N., Utilisation de la methode Rb-Sr pour la datation de niveaux sedimentaires du Precambrien superieur de l'Adrar mauritanien (Sahara occidental) et la mise en evidence de transformations precoces des mineraux argileux, GCA, V37, 2243-2255, 1973

Coello, J., et al., Evolution of the eastern volcanic ridge of the Canary islands based on new K-Ar data, Journal of Volcanology and Geothermal Research, V53, 251-274, 1992

Colin, F., Beauvais, A., Ruffet, G. & Henocque, O., First 40Ar/39Ar geochronology of lateritic manganiferous pisolites: Implications for the Palaeogene history of a West African landscape, Earth and Planetary Science Letters, V238, 172-199, 2005

Collier, J.S., Sansom, V., Ishizuka, O., Taylor, R.N., Minshull, T.A. & Whitmarsh, R.B., Age of Seychelles-India break-up, Earth and Planetary Science Letters, 272, 264-277, 2008

Cornen, G., Bellon, H. & Joron, J.-L., The volcano of Point Gombe (Gabon) and its relations with the Gulf of Guinea, CR Acad Paris, V317, 919-926, 1993

Coulie, E., Quidelleur, X., Gillot, P.-Y., Courtillot, V., Lefevre, J.-C. & Chiesa, S., Comparative K-Ar and Ar/Ar dating of Ethiopian and Yemenite Oligocene volcanism:implications for timing and duration of the Ethiopian traps, Earth and Planetary Science Letters,V206, 477-492, 2003

Crevola, G., Cantagrel, J.-M. & Moreau, C., The Cenozoic volcanism of the Cap-Vert peninsula (Senegal): chronological and geodynamic framework, Bull Soc. Geol. France, V165, 437-446, 1994

Dallmeyer, R.D. & Lecorche, J.P., 40Ar/39Ar polyorogenic mineral age record in the northern Mauritanide orogen, West Africa, Tectonophysics, V177, 81-107, 1990

Dallmeyer, R.D. & Lecorche, J.P., 40Ar/39Ar polyorogenic mineral age record within the central Mauritanide orogen, West Africa, Geological Society of America Bulletin, V101, 55-70, 1989

Dallmeyer, R.D. & Lecorche, J.P., 40Ar/39Ar polyorogenic mineral age record within the southern Mauritanide orogen (M'Bout-Bakel region) West Africa, American Journal of Science, V290, 1136-1168, 1990

Davidson, A. & Rex, D.C., Age of volcanism and rifting in southwestern Ethiopia, Nature, V283, 657-658, 1980

Davison, I., The cooling history of a Pan African Belt in the Adrar des Iforas, (Republic of Mali). Comparison with other Pan African belts, Geologische Rundschau, V70, No3, 842-849, 1981

De Mulder, M. & Pasteels, P., K-Ar geochronology of the Karisimbi volcano (Virunga, Rwanda-Zaire), Journal of African Earth Sciences, V5, No6, 575-579, 1986

De Waele, B. & Fitzsimons, I.C.W., The nature and timing of Palaeoproterozoic sedimentation at the southeastern margin of the Congo Craton; zircon U-Pb geochronology of plutonic, volcanic and clastic units in northern Zambia, Prec.Res., V159,95-116,2007

Delhal, J., Ledent, D. & Pasteels, P., L'age du complexe granitique et migmatitique de Dibaya (Region du Kasai, Zaire) par les methodes Rb-Sr et U-Pb, Annales de la Societe Geologique de Belgique, T98, 141-154, 1975

Demaiffe, D., Moreau, C., Brown, W.L. & Weis, D., Geochemical and isotopitc (Sr, Nd and Pb) evidence on the origin of the anorthosite-bearing anorogenic complexes of the Aïr Province, Niger, Earth and Planetary Science letters, V105, 1991, 28-46

Dickin, A.P., Fallick, A.E., Halliday, A.N., Macintyre, R.M. & Stephens, W.E., An isotopic and geochronological investigation of the younger igneous rocks of the Seychelles microcontinent, Earth and Planetary Science Letters, V81, 46-56, 1986

Djellit, H., et al., Age 40K/40Ar, Carbonifere inferieur, du magmatisme basique filonien du synclinal paleozoique de Tin Serririne, Sud-Est du Hoggar (Algerie), C.R.Geoscience, V338, 624-631, 2006

Dosso, L., Vidal, P., Cantagrel, J.M., Lameyre, J. Marot, A. & Zimine, S., Kerguelen: continental fragment or oceanic island?: petrology and isotopic geochemistry evidence, Earth and Planetary Science Letters, V43, 46-60, 1979

Drake, N.A., El-Hawat, A.S., Turner, P., Armitage, S.J., Salem, M.J., White, K.H. & McLaren, S., Palaeogeography, Palaeoclimatology, Palaeoecology, 2008, V263, 131-145

Drury, S.A., Kelley, S.P., Berhe, S.M., Collier, R.E.Ll. & Abraha, M., Structures related to Red Sea evolution in northern Eritrea, Tectonics, V13, No6, 1371-1380, 1994

Duggen, S., et al., Post-Collisional transition from subduction to intraplate-type magmatism in the Westernmost Mediterranean: evidence for continental-edge delalmination of subcontinental lithosphere, Journal of Petrology, V46, 1155-1201, 2005

Duggen, S., Hoernle, K., Bogaard, P. van den and Harris, C., Magmatic evolution of the Alboran region: The role of subduction in forming the western Mediterranean and causing the Messinian Salinity Crisis, Earth and Planetary Science Letters, V218, 91-108, 2004

Dunai, T.J. & Wijbrans, J.R., Long-term cosmogenic 3He production rates (152ka-1.35Ma) from 40Ar/39Ar dated basalt flows at 29N latitude, Earth and Planetary Science Letters, V176, 147-156, 2000

Duncan, R.A. & Hargraves, R.B., 4. 40Ar/39Ar geochronology of basement rocks from the Mascarene plateau, the Chagos bank and the Maldives ridge, Proc. Of the Ocean Drilling Program, Scientific results, V115, 1990

Duncan, R.A., Hargraves, R.B. & Brey, G.P., Age, palaeomagnetism and chemistry of melilite basalts in the Southern Cape, South Africa, Geological Magazine, V115, No5, 317-396, 1978

Duprat, H.I., Friis, J., Holm, P.M., Grandvuinet, T. & Sørensen, R.V., The volcanic and geochemical development of Sao Nicolau, Cape Verde islands: Constraints from field and 40Ar/39Ar evidence, J. Volc.Geotherm.Res., V162, 1-19, 2007

Dyhr, C.T. & Holm, P.M., A volcanological and geochemical investigation of Boa Vista, Cape Verde Islands; 40Ar/39Ar geochronology and field constraints, Journal of Volcanology and Geothermal Research, V189, 19-32, 2010

Ebinger, C.J., Deino, A.L., Drake, R.E. & Tesha, A.L., Chronology of volcanism and rift basin propagation: Rungwe Volcanic province, East Africa, Journal of Geophysical Research, V94, No B11, 15785-15803, 1989

Ekwueme, B.N. & Kröner, A., Single zircon ages of migmatitic gneisses and granulites in the Obudu Plateau: Timing of granulite-facies metamorphism in southeastern Nigeria, Journal of African Earth Sciences, V44, 459 - 469, 2006

Ekwueme, B.N., Basaltic magmatism related to the early stages of rifting along the Benue Trough: the Obudu dolerites of south-east Nigeria, Geological Journal, V29, 269-276, 1994

El Azzouzi, M., Bernard-Griffiths, J., Bellon, H., Maury, R.C., Pique, A., Fourcade, S., Cotten, J. & Hernandez, J., Evolution of the sources of Moroccan volcanism during the Neogene, CR Paris, V329, 95-102, 1999

El Azzouzi, M., Maury, R.C., Bellon, H., Youbi, N., Cotten, J. & Kharbouch, F., Petrology and K-Ar chronology of the Neogene-Quaternary Middle Atlas basaltic province, Morocco, Bull. Soc. Geol. France, V181, 243-257, 2010

El Bakkali, S., Gourgaud, A., Bourdier, J.-L., Bellon, H., Gundogdu, N., Post-collision neogene volcanism of the Eastern Rift (Morocco): magmatic evolution through time, Lithos, V45, 523-543, 1998

El-Makhrouf, A.A., Tectonic interpretation of Jabal Eghei area and its regional application to Tibesti orogenic belt, south central Libya (S.P.L.A.J.), Journal of African Earth Sciences, V7, No7/8, 945-967, 1988

Emerick, C.M. & Duncan, R.A., Age progressive volcanism in the Comores Archipelago, western Indian ocean and implications for Somali plate tectonics, Earth and Planetary Science Letters, V60, 415-428, 1982

Emmel, B., et al., From closure of the Mozambique ocean to Gondwana breakup: new evidence from geochronological data of the Vohibory terrane, Southwest Madagascar, Journal of Geology, V116, 21-38, 2008

Escrig, S., Schiano, P., Schilling, J.-G. & Allegre, C., Rhenium-osmium isotope systematics in MORB from the Southern Mid-Atlantic ridge (40-50 S), Earth and Planetary Science Letters, V235, 528-548, 2005

Feraud, G., et al., New K-Ar ages, chemical analyses and magnetic data of rocks from the islands of Santa Maria (Azores), Porto Santo and Madeira (Madeira archipelago) and Gran Canaria (Canary Islands), Bull. Volc., V44, No3, 359-375, 1981

Feraud, G., Giannerini, G., Campredon, R. & Stillman, C.J., Geochronology of some Canarian dike swarms: contribution to the volcano-tectonic evolution of the archipelago, Journal of Volcanology and Geothermal research, V25, 29-52, 1985

Feraud, G., Kaneoka, I. & Allegre, C.J., K/Ar ages and stress pattern in the Azores: geodynamic implications, Earth and Planetary Science Letters, V46, 275-286, 1980

Ferguson, D.J., Barnie, T.D., Pyle, D.M., Oppenheimer, C., Yirgu, G., Lewi, E., Kidane, T., Carn, S. & Hamling, I., Recent rift-related volcanism in Afar, Ethiopia, Earth and Planetary Science Letters, V292, 409-418, 2010

Ferkous, K. & Monie, P., Neoproterozoic shearing and auriferous hydrothermalism along the lithospheric N-S East In Ouzzal shear zone (Western Hoggar, Algeria, North Africa), Journal of African Earth Sciences, V35, 399-415, 2002

Ferrara, G. & Gravelle, M., Radiometric ages from western Ahaggar (Sahara) suggesting an eastern limit for the West African Craton, Earth and Planetary Science letters, V1, 319-324, 1966

Fiechtner, L., Friedrichsen, H. & Hammerschmidt, K., Geochemistry and geochronology of Early Mesozoic tholeiites from Central Morocco, Geologische Rundschau, V81, No1, 45-62, 1992

Fitch, F.J., Hooker, P.J. & Miller, J.A., 40Ar/39Ar dating of the KBS Tuff in Koobi Fora Formation, East Rudolf, Kenya, Nature, V263, 740-744, 1976

Franz, G., Puchelt, H. & Pasteels, P., Petrology, geochemistry and age relations of Triassic and Tertiary volcanic rocks from SW Egypt and NW Sudan, Journal of African Earth Sciences, V6, No3, 335-352, 1987

Franz, G., Pudlo, D., Urlacher, G., Haußmann, U., Boven, A. & Wemmer, K., The Darfur dome, western Sudan: the product of a subcontinental mantle plume, Geologische Rundschau, V83, 614-623, 1994

Frimmel, H.E., Tack, L., Basei, M.S., Nutman, A.P. & Boven, A., Provenance and chemostratigraphy of the Neoproterozoic West Congolian Group in the Democratic Republic of Congo, Journal of African Earth Sciences, V46, 221-239, 2006

Furman, T., Kaleta, K.M., Bryce, J.G. & Hanan, B.B., Tertiary Mafic lavas of Turkana, Kenya: constraints on East African Plume structure and the occurrence og high-μ volcanism in Africa, Journal of Petrology, V47, No6, 1221-1244, 2006

Gagnevin, D., et al., Open-system processes in the genesis of silica-oversaturated alkaline rocks of the Rallier-du-Baty Peninsula, Kerguelen archipelago (Indian Ocean), Journal of Volcanology and Geothermal Reseach, V123, 267-300, 2003

Geldmacher, J., Bogaard, P.v.d., Hoernle, K. & Schmincke, H.-U., The 40Ar/39Ar age dating of the Madeira Archipelago and hotspot track (eastern North Atlantic), Geochemistry, Geophysics, Geosystems, V1, No1, 2000

Geldmacher, J., Hoernle, K., Bogaard, P.v.d., Duggen, S. & Werner, R., New 40Ar/39Ar age and geochemical data from seamounts in the Canary and Madeira volcanic provinces: Support for the mantle plume hypothesis, Earth and Planetary Science Letters, V237, 85-101, 2005

Geldmacher, J., Hoernle, K., Klugel, A., Bogaard, P. van den , Wombacher, F. & Berning, B., Origin and geochemical evolution of the Madeira-Tore Rise (eastern North Atlantic), Journal of Geophysical Research, V111, B09206, 10.1029/2005JB003931, 2006

Geldmacher, J., Hoernle, K., Klugel, A., Bogaard, P. van den and Duggen, S., A geochemical transect across a heterogeneous mantle upwelling: Implications for the evolution of the Madeira hotspot in space and time, Lithos, V90, 131-144, 2006

George, R., Rogers, N. & Kelley, S., Earliest magmatism in Ethiopia: evidence for two mantle plumes in one flood basalt province, Geology, V26, 923-926, 1998

Gillot, P.-Y. & Nativel, P., K-Ar chronology of the ultimate activity of Piton des Neiges volcano, Reunion Island, Indian Ocean, Journal of Volcanology and Geothermal Research, V13, 131-146, 1982

Giret, A., Tourpin, S., Marc, S., Verdier, O. & Cottin, J.-Y., Volcanisme de l'ile aux Pingouins, archipel Crozet, temoin de l'heterogeneite du manteau fertile au sud de l'ocean Indien, C.R. Geoscience, V334, 481-488, 2002

Goscombe, B., Gray, D., Armstrong, R., Foster, D.A. & Vogel, J., Event geochronology of the Pan-African Kaoko belt, Namibia, Precambrian Research, V140, 1-41, 2005

Gourgaud, A. & Vincent, P.M., Petrology of two continental alkaline intraplate series at Emi Koussi volcano, Tibesti, Chad, Journal of Volcanology and Geothermal Research, V129, 261-290, 2004

Grant, N.K., Rex, D.C. & Freeth, S.J., Potassium-Argon ages and strontium isotope ratio measurements from volcanic rocks in Northeastern Nigeria, Contributions to Mineralogy and petrology, V35, 277-292, 1972

Gunnell, Y., Radiometric ages of laterites and constraints on long-term denudation rates in West Africa, Geology, V31, 131 - 134, 2003

Hajash, A. & Armstrong, R.L., Paleomagnetic and radiometric evidence for the age of the Comores islands, west central Indian ocean, Earth and Planetary Science Letters, V16, 231-236, 1972

Hammor, D. & Lancelot, J., Métamorphisme miocène de granites panafricains dans le massif de l'Edough (Nord-Est de l'Algérie), C.R.Acad.Sci.Paris, Sciences de la terre et des planètes, V327, 1998, 391-396

Hammor, D., Bosch, D., Caby, R. & Bruguier, O., A two-stage exhumation of the Variscan crust: U-Pb LA-ICP-MS and Rb-Sr ages from Greater Kabylia, Maghrebides, Terra Nova, V18, 299-307, 2006

Harris, C., Bell, J.D. & Atkins, F.B., Isotopic composition of lead and strontium in lavas and coarse-grained blocks from Ascension island, South Atlantic, Earth and Planetary Science Letters, V60, 79-85, 1982

Hemsted, T., Second and third millennium reserves development in African basins, Geological Society of London Special Publication 207, 9-20, doi: 10.1144/GSL.SP.2003.207.01.02, 2003

Henry, B., et al., Repeated granitoid intrusions during the Neoproterozoic along the western boundary of the Saharan metacraton, Eastern Hoggar, Tuareg Shield, Algeria: An AMS and U-Pb zircon age study, Tectonophysics, V474, 417-434, 2009

Herrero-Bervera, E., Ubangoh, R., Aka, F.T. & Valet, J.-P., Paleomagnetic and paleosecular variation study of the Mt. Cameroon volcanics (0.0-0.25 Ma), Cameroon, West Africa, Physics of the Earth and Planetary Interiors, V147, 171-182, 2004

Hirdes, W., Davis, D.W., Ludtke, G. & Konan, G., Two generations of Birimian (Paleoproterozoic) volcanic belts in northeastern Cote d'Ivoire (West Africa): consequences for the 'Birimian controversy', Precambrian Research, V80, 173-191, 1996

Hofmann, c., Courtillot, v., Feraud, G., Rochette, P., Yirgu, G., Ketefo, E. & Pik, R., Timing of the Ethiopian flood basalt event and implications for plume birth and global change, Nature, V389, 838-841, 1997

Holm, P.M., Grandvuinet, T., Friis, J., Wilson, J.R., Barker, A.K. & Plesner, S., An 40Ar-39Ar study of the Cape Verde hot spot: Temporal evolution in a semistationary plate environment, J.Geophys. Res., V113, B08201, 10.1029/2007JB00533, 2008

Jacquemin, H., Sheppard, S.M.F., Vidal, P., Isotopic geochemistry (O, Sr, Pb) of the Golda Zuelva and Mboutou anorogenic complexes, North Cameroun: mantle origin with evidence for crustal contamination, Earth and Planetary Science Letters, V61, 97-111, 1982

Jahn, B., Caby, R. & Monie, P., The oldest UHP eclogites of the world: age of UHP metamorphism, nature of protoliths and tectonic implications, Chemical Geology, V178, 143 - 158, 2001

John, T., et al., Evidence for a Neoproterozoic ocean in south-central Africa from mid-oceanic-ridge-type geochemical signatures and pressure-temperature estimates of Zambian eclogites, Geology, V31, No3, 243-246, 2003

Johnson, S.P., et al., Geochemistry, geochronology and isotopic evolution of the Chewore-Rufunsa Terrane, Southern Irumide Belt: a Mesoproterozoic Continental Margin Arc, Journal of Petrology, V48, No7, 1411-1441, 2007

Johnson, S.P., et al., Geochronology of the Zambezi Supracrustal sequence, southern Zambia: a record of Neoproterozoic divergent processes along the Southern Margin of the Congo craton, J.Geology, V115, 355-374, 2007

Jones, E.J.W., Goddard, D.A., Mithcell, J.G. & Banner, F.T., Lamprophyric volcanism of Cenozoic age on the Sierra Leone Rise: Implications for regional tectonics and the stratigraphic time scale, Marine Geology, V99, 19-28, 1991

Jung, S., Kröner, A. & Kröner, S., A ~700 Ma Sm-Nd garnet-whole rock age from the granulite facies Central Kaoko Zone (Namibia): Evidence for a cryptic high-grade polymetamorphic history?, Lithos, V97, 247-270, 2007

Justin-Visentin, E., Nicoletti, M., Tolomeo, L. & Zanettin, B., Miocene and Pliocene volcanic rocks of the Addis Ababa-Debra Berhan area (Ethiopia). Geo-petrographic and radiometric study, Bulletin of Volcanology, V38, No1, 237-253, 1974

Kagou Dongmo, A., et al., The discovery of late Quaternary basalt on Mount Bambouto: implications for recent widespread volcanic activity in the southern Cameroon line, Journal of African Earth Sciences, V57, 96-108, 2010

Kamgang, P., Chazot, G., Njonfang, E. & Tchoua, F., Geochemistry and geochronology of mafic rocks from Bamenda mountains (Cameroon): source composition and crystal contamination along the Cameroon Volcanic Line, C.R. Geoscience, V340, 850-857, 2008

Kamgang, P., Njonfang, E., Chazot, G. & Tchoua, F., Geochemistry and geochronology of the felsic lavas of the Bamenda Mountains (Cameroon Volcanic line), C.R. Geoscience, V339, 659-666, 2007

Kampunzu, A.B., Bonhomme, M.G. & Kanika, M., Geochronology of volcanic rocks and evolution of the Cenozoic Western Branch of the East African Rift System, Journal of African Earth Sciences, V26, No3, 441 - 461, 1998

Kampunzu, A.B., Kramers, J.D. & Makutu, M.N., Rb-Sr whole rock ages of the Lueshe, Kirumba and Numbi igneous complexes (Kivu, Democratic Republic of Congo) and the break-up of the Rodinia supercontinent, Journal of African Earth Sciences, V26, No1, 29-36, 1998

Kapenda, D., Bonhomme, M.G. & Kampunzu, A.B., Le plutonisme ubendien du Nord-Est du Shaba (Zaire): chronologie K-Ar et implication geodynamique, Journal of African Earth Sciences, V9, No1, 113 - 121, 1989

Karche, J.-P. & Vachette, M., Age et migration de l'activite magmatique dans les complexes paleozoiques du Niger. Consequences., Bull. Soc. Geol. France, No6, 941-953, 1978

Kempe, D.R.C. & Schilling, J.-G., Discovery Tablemount basalt: Petrology and geochemistry, Contributions to Mineralogy and Petrology,, V44, 101-115, 1974

Kenea, N.H., Ebinger, C.J. & Rex, D.C., Late Oligocene volcanism and extension in the southern Red Sea Hills, Sudan, Journal of the Geological Society, London, V158, 285-294, 2001

Key, R.M., Rop, B.P. & Rundle, C.C., The development of the Late Cenozoic alkali basaltic Marsabit Shield volcano, northern Kenya, Journal of African Earth Sciences, V6, No4, 475-491, 1987

Kidane, T., et al., New paleomagnetic and geochronologic results from Ethiopian Afar: block rotations linked to rift overlap and propagation and determination of a ~2Ma reference pole for stable Africa, Journal of Geophysical Reseach, V108, B2, 2001JB000645, 2003

Kieffer, B., Arndt, N., Lapierre, H., Bastien, F., Bosch, D., Pecher, A., Yirgu, G., Ayalew, D., Weis, D., Jerram, D.A., Keller, F. & Meugniot, C., Flood and shield basalts from Ethiopia: Magmas from the African superswell, Journal of Petrology, V45, 793-834, 2004

Kokonyangi, J., et al., Petrology and geochronology of mesoproterozoic mafic-intermediate plutonic rocks from Mitwaba (D.R. Congo): implications for the evolution of the Kibaran belt in central Africa, Geol.Mag., V142(1), 109-130, 2005

Kokonyangi, J., et al., U-Pb zircon geochronology and petrology of granitoids from Mitwaba (Katanga, Congo): implications for the evolution of the Mesoproterozoic Kibaran belt, Precambrian Research, V132, 79-106, 2004

Kouamelan, A.N., Delor, C. & Peucat, J.-J., Geochronological evidence for reworking of Archean terrains during the Early Proterozoic (2.1 Ga) in the western Cote d'Ivoire (Man Rise-West African Craton), Precambrian Research, V86, 177-199,1997

Kuepouo, G., Tchouankoue, J.P., Nagao, T. & Sato, H., Transitional tholeiitic basalts in the Tertiary Bana volcano-plutonic complex, Cameroon line, Journal of African Earth Sciences, V45, 318-332, 2006

Lahitte, P., Gillot, P.-Y., Kidane, T., Courtillot, V. & Bekele, A., New age constraints on the timing of volcanism in central Afar, in the presence of propagating rifts, Journal of Geophysical Research, V108, B2, 10.1029/2001JB001689, 2003

Lancelot, J., Vitrac, A. & Allegre, C.J., Uranium and lead isotopic dating with grain-by-grain zircon analysis: a study of complex geological history with a single rock, Earth and Planetary Science letters, V29, 357-366, 1976

Lancelot, J.R., Boullier, A.M., Maluski, H. & Ducrot, J., Deformation and related radiochronology in a Late Pan-African Mylonitic Shear Zone, Adrar des Iforas (Mali), Contributions to Mineralogy and Petrology, 1983, V82, 312 - 326

Leclaire, L., et al., Lower Cretaceous basalt and sediments from the Kerguelen plateau, Geo-Marine Letters, V7, 169-176, 1987

Lee, D.-C., Halliday, A.N., Fitton, J.G. & Poli, G., Isotopic variations with distance and time in the volcanic islands of the Cameroon line: evidence for a mantle plume origin, Earth and Planetary Science Letters, V123, 119-138, 1994

Lee, D.-C., Halliday, A.N., Godfrey Fitton, J., and Poli, G., Isotopic variations with distance and time in the volcanic islands of the Cameroon line: evidence for a mantle plume origin, Earth and Planetary Science Letters, V123, 119-138, 1994

Lenat, J.-F., Boivin, P., Deniel, C., Gillot, P.-Y., Bachelery, P. & Fournaise 2 Team, Age and nature of deposits on the submarine flanks of Piton de la Fournaise (Reunion island), Journal of Volcanology and Geothermal Research, V184, 199-207, 2009

Lerouge, C., et al., Shrimp U-Pb zircon age evidence for Paleoproterozoic sedimentation and 2.05 ga syntectonic plutonism in the Nyong Group, South-Western Cameroon, Journal of African Earth Sciences, V44, 413-427, 2006

Liegeois, J.P., Black, R., Navez, J. & Latouche, L., Early and late Pan-African orogenies in the Aïr assembly of terranes (Tuareg shield, Niger), Precambrian Research, V67, 59-88, 1994

Liegeois, J.P., Claessens, W., Camara, D. & Klerkx, J., Short-lived Eburnian orogeny in southern Mali. Geology, tectonics, U-Pb and Rb-Sr geochronology, Precambrian Research, V50, 111-136, 1991

Liegeois, J.P., Latouche, L., Boughrara, M., Navez, J. & Guiraud, M., The LATEA metacraton (Central Hoggar, Tuareg shield, Algeria): behaviour of an old passive margin during the Pan-African orogeny, Journal of African Earth Sciences, V37, 161-190, 2003

Liegeois, J.P., Sauvage, J.F. & Black, R., The Permo-Jurassic alkaline province of Tadhak, Mali: Geology, geochronology and tectonic significance, Lithos, V27, 95-105, 1991

Lo, P.G., Dia, a. & Kampunzu, A.B., Cenozoic volcanism in Western Senegal and its relationship to the opening of the Central Atlantic Ocean, Tectonophysics, V209, 281-291, 1992

Louni-Hacini, A., et al., Datation 40K-40Ar de la transition du volcanisme calco-alcalin au volcanisme alcalin en Oranie au Miocene superieur, C.R. Acad. Sci. Paris, t321, 975-982, 1995

Lucassen et al., Nd, Pb, and Sr isotope composition of Late Mesozoic to Quaternary intra-plate magmatism in NE-Africa (Sudan, Egypt): high-μ, signatures from the mantle lithosphere, Contributions to Mineralogy and Petrology,, V156, No6, 765-784, 2008

Luft, F.F., Luft Jr., J.L., Chemale Jr., F., Lelarge, M.L.M.V. & Avila, J.N., Post-Gondwana break-up record constraints from apatite fission track thermochronology in NW Namibia, Radiation Measurements, V39, 675-679, 2005

Maboko, M.A.H., et al., Zircon U-Pb and biotite Rb-Sr dating of the Wami river granulites, eastern granulites, tanzania, Precambrian Research, V30, 361-378, 1985

Macintyre, R.M., Mitchell, J.G. & Dawson, J.B., Age of fault movements in Tanzanian Sector of East African Rift system, Nature, V247, 354-356, 1974

Maier, W.D., Peltonen, P. & Livesey, T., The ages of the Kabanga north and Kapalagulu intrusions, western Tanzania: a reconnaissance study, Economic Geology, V102, 147-154, 2007

Makobo, M.A.H., Dating Post-Metamorphic Cooling of the Eastern Granulites in the Mozambique Belt of Northern Tanzania Using the Garnet Sm-Nd Method, Gondwana Research, V4, No3, 329 - 336, 2001

Maluski, H., Coulon, C., Popoff, M. & Baudin, P., 40Ar/39Ar chronology, petrology and geodynamic setting of Mesozoic to early Cenozoic magmatism from the Benue Trough, Nigeria, Journal of the Geological Society of London, V152, 311-326, 1995

Maluski, H., Lepvrier, C. & Biardeau, V., Epimetamorphisme syntectonique d'age 85 Ma dans les zones nord-telliennes (Algerie), C.R. Acad. Sc. Paris, t.288, No 21, 1583-1586, 1979

Marignac, Chr. & Zimmermann, J.-L., Ages K-Ar de l'Événement hydrothermal et des intrusions associéees dans le district minéralisé miocène d'Aïn-Barbar (Est Constantinois, Algérie), Mineral.Deposita, V18, 1983, 457-467

Marzoli, A., et al., Silicic magmas from the continental Cameroon Volcanic Line (Oku, Bambouto and Ngaoudere): 40Ar-39Ar dates, petrology, Sr-Nd-O isotopes and their petrogenetic significance, Contributions to Mineralogy and Petrology,, V135, 133-150, 1999

Marzoli, A., et al., The Cameroon volcanic line revisited: Petrogenesis of continental basaltic magmas from lithospheric and asthenospheric mantle sources, Journal of Petrology, V41, No 1, 87-109, 2000

Mayer, A., Hofmann, A.W., Sinigoi, S. & Morais, E., Mesoproterozoic Sm-Nd and U-Pb ages for the Kunene Anorthosite Complex of SW Angola, Precambrian Research, V133, 187-206, 2004

McDougall, I. & Brown, F.H., Timing of volcanism and evolution of the northern Kenya Rift, Geological Magazine, 146(1), 34-47, 2008

McDougall, I. & Chamalaun, F.H., Isotopic dating and geomagnetic polarity studies on volcanic rocks from Mauritius, Indian Ocean, Geological Society of America bulletin, v80, 1419-1442, 1969

McDougall, I. & Ollier, C.D., Potassium-argon ages from Tristan da Cunha, South Atlantic, Geological Magazine, V119, No1, 87-93, 1982

McDougall, I. & Schmincke, H.-U., Geochronology of Gran Canaria, Canary Islands: age of shield building volcanism and other magmatic phases, Bull. Volcanol. V40, No1, 57-77, 1976

McDougall, I. & Watkins, R.T., Geochronology of the Nabwal hills: a record of earliest magmatism in the northern Kenyan Rift Valley, Geological Magazine, 143(1), 25-39, 2006

McDougall, I., The geochronology and evolution of the young volcanic island of Reunion, Indian Ocean, Geochimica et Cosmochimica Acta, V35, 261-288, 1971

McDougall, I., Verwoerd, W. & Chevallier, L., K-Ar geochronology of Marion island, Southern Ocean, Geological Magazine, V138, No1, 1-17, 2001

Meert, J.S., Hargraves, R.B., Van der Voo, R., Hall, C.M. & Halliday, A.N., Paleomagnetic and 40Ar/39Ar studies of Late Kibaran Intrusives in Burundi, East Africa: Implications for Late Proterozoic Supercontinents, Journal of Geology, V102, 621-637, 1994

Meneisy, M.Y. & Kreuzer, H., Potassium-Argon ages of Egyptian basaltic rocks, Geol. Jb., D9, 21-31, 1974

Merle, R., et al., Evidence of multi-phase Cretaceous to Quaternary alkaline magmatism on Tore Madeira Rise and neighbouring seamounts from 40Ar/39Ar ages, Journal of the Geological Society, London, V166, 879-894, 2009

Meyer, F.M., Kolb, J., Sakellaris, G.A. & Gerdes, A., New ages from the Mauritanides belt: recognition of Archean IOCG mineralization at Guelb Moghrein, Mauritania, Terra Nova, V18, 345 - 352, 2006

Miller, J.A. & Mohr, P.A., Age of the Wochacha trachyte-carbonatite volcanic centre, Geophys. Observatory Addis Ababa Bull, V9, 1-5, 1966

Miller, J.A. & Mudie, J.D., Potassium-argon age determinations on granite from the island of Mahe in the Seychelles archipelago, Nature, V192, 1174-1175, 1961

Monie, P., Maluski, H., Saadallah, A. & Caby, R., New 39Ar-40Ar ages of Hercynian and Alpine thermotectonic events in Grande Kabylie (Algeria), Tectonophysics, V152, 53-69, 1988

Monie, P., Montigny, R. & Maluski, H., Age burdigalien de la tectonique ductile extensive dans le massif de l'Edough (Kabylies, Algerie). Donnees radiometriques 39Ar/40Ar, Bull. Soc. Geol. France, t163, No5, 571-584, 1992

Montigny, R., Ngounouno, I. & Deruelle, B., K-Ar ages of magmatic rocks from the Garoua rift: their place in the frame of the Cameroun line, C.R. Geoscience, V336, 1463-1471, 2004

Mourao, C. et al., Quaternary extrusive calciocarbonatite volcanism on Brava Island (Cape Verde): A nephelinite-carbonatite immiscibility product, Journal of African Earth Sciences, V56, 59-74, 2010

Müller-Sohnius, D. & Horn, P., K-Ar dating of ring complexes and fault systems in Northern Kordofan, Sudan: evidence for independent magmatic and tectonic activity, Geologische Rundschau, V83, 604-613, 1994

Navez, J., Liegeois, J.P., Latouche, L., Boven, A. & Black, R., The Palaeoproterozoic Tchilit exotic terrane (Air, Niger) within the Pan-African collage of the Tuareg shield, Journal of the Geological Society, London, V156, 247 - 259, 1999

Nkouathio, D.G., et al., Evolution of volcanism in graben and horst structures along the Cenozoic Cameroon line (Africa): implications for tectonic evolution and mantle source composition, Miner.Petrol., V94, 287-303, 2008

Noble, W.P., Foster, D.A. & Gleadow, A.J.W., The post-Pan-African thermal and extensional history of crystalline basement rocks in eastern Tanzania, Tectonophysics, V275, 331-350, 1991

Nonnotte, P., Guillou, H., Le Gall, B., Benoit, M., Cotten, J. & Scaillet, S., New K-Ar age determinations of Kilimanjaro volcano in the North Tanzanian diverging rift, East Africa, Journal of Volcanology and Geothermal Research, V173, 99-112, 2008

Nougier, J., Cantagrel, J.M. & Karche, J.P., The Comores archipelago in the western Indian ocean: volcanology, geochronology and geodynamic setting, Journal of African Earth Sciences, V5, No2, 135-145, 1986

O'Connor, J. & Roex, P. Le, South Atlantic hot spot-plume systems: 1. Distribution of volcanism in time and space, Earth and Planetary Science Letters, V113, 343-364, 1992

O'Connor, J.M. & Duncan, R.A., Evolution of the Walvis Ridge-Rio Grande rise hot spot system: Implications for African and South American plate motions over plumes, Journal of Geophysical Research, V95, No.B11, 17475-17502, 1990

O'Connor, J.M., Stoffers, P., Bogaard, P. Van den, McWilliams, M., First seamount age evidence for significantly slower African plate motion since 19 to 30 Ma, Earth and Planetary Science Letters, V171, 575-589, 1999

Pallister, J.S., Magmatic history of Red Sea rifting: perspective from the central Saudi Arabian coastal plain, Geological Society of America Bulletin, V98, 400-417, 1987

Paquette, J.L., Caby, R., Djouadi, M.T. & Bouchez, J.L., U-Pb dating of the end of the Pan-African orogeny in the Tuareg shield: the post-collisional syn-shear Tioueine pluton (Western Hoggar, Algeria), Lithos, V45, 245-253, 1998

Pasteels, P., Villeneuve, M., De Paepe, P. & Klerkx, J., Timing of volcanism of the southern Kivu province: implications for the evolution of the western branch of the East African Rift system, Earth and Planetary Science letters, V94, 353 - 363, 1989

Peccerillo, A., et al., Relationships between mafic and peralkaline silicic magmatism in continental rift settings: a petrological, geochemical and isotopic study of the Gedemsa volcano, Central Ethiopian rift, Journal of Petrology, V44, 2003-2032, 2003

Pegram, W.J., Register, J.K.Jr., Fullagar, P.D., Ghuma, M.A., Rogers, J.J.W., Pan-African ages from a Tibesti massif batholith, southern Libya, Earth and Planetary Science Letters, V30, 1976, 123-128

Penaye, J., Kröner, A., Toteu, S.F., Van Schmus, W.R. & Doumnang, J.-C., Evolution of the Mayo Kebbi region as revealed by zircon dating: An early (ca. 740 Ma) Pan-African magmatic arc in southwestern Chad, Journal of Earth Sciences, V44, 530-542, 2006

Peucat, J.J., Drareni, A., Latouche, L., Deloule, E. & Vidal, P., U-Pb zircon (TIMS and SIMS) and Sm-Nd whole-rock geochronology of the Gour Oumelalen granulitic basement, Hoggar Massif, Tuareg Shield, Algeria, Journal of African Earth Sciences, V37, 229-239, 2003

Pin, C. & Poidevin, J.L., U-Pb zircon evidence for a pan-african granulite facies metamorphism in the central african republic. A new interpretation of the high-grade series of the northern border of the Congo craton, PrecambrianResearch, V36, 303-312, 1987

Plesner, S., Holm, P.M. & Wilson, J.R., 40Ar/39Ar geochronology of Santo Antao, Cape Verde Islands, Journal of Volcanology and Geothermal Research, V120, 103-121, 2002

Potrel, A., Peucat, J.J. & Fanning, C.M., Archean crustal evolution of the West African Craton: example of the Amsaga Area (Reguibat Rise). U-Pb and Sm-Nd evidence for crustal growth and recycling, Precambrian Research, V90, 107 - 117, 1998

Pouclet, A., Ahmed, Y., Baubron, J.-C., Bellon, H. & Morel, A., Age and setting of the Cenozoic volcanism in the Tefidet Graben (Rift system of eastern Niger), C.R. Acad. Paris, V318, 683-690, 1994

Pouclet, A., et al., The Cambrian volcano-sedimentary formations of the westernmost High Atlas (Morocco): their place in the geodynamic evolution of the West African Palaeo-Gondwana northern margin, Geol. Soc. Spec. Publ. 297, 303-327, 2008

Prestvik, T. & Winsnes, T.S., Geology of Bouvetøya, South Atlantic, Norsk Polarinstitutt Skrifter, V175, 41-69, 1981

Quidelleur, X., Holt, J.W., Salvany, T. & Bouquerel, H., New K-Ar ages from La Montagne massif, Reunion island (Indian ocean), supporting two geomagnetic events in the time period 2.2-2.0 Ma, Geophys. J. Int., V182, 699-710, 2010

Rachdi, H., Berrahma, M., Delaloye, M., Faure-Muret, A. & Dahmani, M., Le volcanisme tertiaire du Rekkame (Maroc): petrologie, geochimicie et geochronologie, Journal of African Earth Sciences, V34, No3, 259-269, 1997

Rahaman, M.A., Van Breemen, O., Bowden, P. & Bennett, J.N., Age migrations of anorogenic ring complexes in northern Nigeria, Journal of Geology, V92, 173-1984, 1984

Rainaud, C., et al., Geochronology and nature of the Palaeoproterozoic basement in the Central African Copperbelt (Zambia and the Democratic Republic of Congo), with regional implications, Journal of African Earth Sciences, V42, 1-31, 2005

Rainaud, C., Master, S., Armstrong, R.A. Phillips, D. & Robb, L.J., Monazite U-Pb dating and 40Ar/39Ar thermochronology of metamorphic events in the Central African Copperbelt during the Pan-African Lufilian Orogeny, Journal of African Earth Sciences, V42, 183-199, 2005

Richards, J.P., et al., Pb isotope constraints on the age of sulfide ore deposition and U-Pb age of late uraninite veining at the Musoshi stratiform copper deposit, Central African Copper Belt, Zaire, Economic Geology, V83, 724-741, 1988

Richards, J.P., Krogh, T.E. & Spooner, E.T.C., Fluid inclusion characteristics and U-Pb rutile age of late hydrothermal alteration and veining at the Musoshi Stratiform copper deposit, Central African Copper Belt, Zaire, Economic Geology, V83, 118-139, 1988

Ries, A.C., Shackleton, R.M. & Dawoud, A.S., Geochronology, geochemistry and tectonics of the NE Bayuda desert, N Sudan: implications for the western margin of the late Proterozoic fold belt of NE Africa, Precambrian Research, V30, 43-62, 1985

Ryall, P.J.C., Blanchard, M.-C. & Medioli, F., A subsided island west of Flores, Azores, Canadian Journal of Earth Sciences, V20, 764-775, 1983

Satir, M., Morteani, G., Fuganti, A. & Drach, V. von, K-Ar ages, Sr-isotopic compositions and chemistry of late Cretaceous-Tertiary basalts from the Nubian desert (northern Sudan), Eur. J. Mineral, V3, 943-955, 1991

Schneider, J., Melcher, F. & Brauns, M., Concordant ages for the giant Kipushi base metal deposit (DR Congo) from direct Rb-Sr and Re-Os dating of sulfides, Mineralium Deposita, V42, 791 - 797, 2007

Schofield, D.I., Horstwood, M.S.A., Pitfield, P.E.J., Crowley, Q.G., Wilkinson, A.F. & Sidaty, H.CH.O., Timing and kinematics of Eburnean tectonics in the central Reguibat Shield, Mauritania, Journal of the Geological Society, London, V163, 549-560,2006

Sebai, A., Feraud, G., Bertrand, H. & Hanes, J., 40Ar/39Ar dating and geochemistry of tholeiitic magmatism related to the early opening of the Central Atlantic rift, Earth and Planetary Science letters, V104, 1991, 455 - 472

Seth, B., Armstrong, R.A., Büttner, A. & Villa, I.M., Time constraints for Mesoproterozoic upper amphibolite facies metamorphism in NW Namibia: a multi-isotopic approach, Earth and Planetary Science Letters, V230, 355-378, 2005

Seth, B., Kröner, A., Mezger, K., Nemchin, A.A., Pidgeon, R.T. & Okrusch, M., Archaean to Neoproterozoic magmatic events in the Kaoko belt of NW Namibia and their geodynamic significance, Precambrian Research, V92, 341-363, 1998

Shang, C.K., et al., TTG magmatism in the Congo craton; a view from major and trace element geochemistry, Rb-Sr and Sm-Nd systematics: case of the Sangmelima region, Ntem complex, southern Cameroon, Journal of African Earth Sciences, V40, 61-79, 2004

Singletary, S.J., et al., Geochronology of basement rocks in the Kalahari Desert, Botswana, and implications for regional Proterozoic tectonics, Precambrian Research, V121, 47-71, 2003

Soumaila, A., et al., REE patterns, Nd-Sm and U-Pb ages of the metamorphic rocks of the Diagorou-Darbani greenstone belt (Liptako, SW Niger): implication for Birimian (Palaeoproterozoic) crustal genesis, Geol. Soc.Spec.Publ. 297, 19-32, 2008

Staudigel, H., Feraud, G. & Giannerini, G., The history of intrusive activity on the island of La Palma (Canary Islands), Journal of Volcanology and Geothermal Research, V27, 299-322, 1986

Stendal, H., et al., Derivation of detrital rutile in the Yaounde region from the Neoproterozoic Pan-African belt in southern Cameroon (Central Africa), Journal of African Earth Sciences, V44, 443-458, 2006

Suayah, I.B. & Rogers, J.J.W., Geochemistry, chronology and petrogenesis of the Wadi Yebigue pluton, Central Tibisti Massif, Libya, Journal of African Earth Sciences, 1986, V5, No 4, 413-422

Suayah, I.B., Miller, J.S., Miller, B.V., Bayer, T.M. & Rogers, J.J.W., Tectonic significance of Late Neoproterozoic granites from the Tibesti massif in S. Libya inferred from Sr and Nd isotopes and U-Pb zircon data, Journal of African Earth Sciences, V44, 561-570, 2006

Sørensen, H., The Alkaline Rocks, John Wiley & Sons, 1974
Tack, L. & Bowden, P., Post-collisional granite magmatism in the central Damaran (Pan-African) Orogenic Belt, western Namibia, Journal of African Earth Sciences, V28, No3, 653 - 674, 1999

Tegtmeyer, A. & Kröner, A., U-Pb zircon ages for granitoid gneisses in northern Namibia and their significance for proterozoic crustal evolution of southwestern Africa, Precambrian Research, V28, 311-326, 1985

Toteu, S.F., et al., Diachronous evolution of volcano-sedimentary basins north of the Congo craton: Insights from U-Pb ion microprobe dating of zircons from the Poli, Lom and Yaounde Groups (Cameroon), Journal of African Earth Sciences, V44, 428-442, 2006

Toteu, S.F., et al., U-Pb dating of plutonic rocks involved in the nappe tectonic in southern Cameroon: consequence for the Pan-African orogenic evolution of the central African fold belt, Journal of African Earth Sciences, V44, 479-493, 2006

Toteu, S.F., Michard, A., Bertrand, J.M. & Rocci, G., U/Pb dating of precambrian rocks from northern Cameroon, orogenic evolution and chronology of the Pan-African belt of Central Africa, Precambrian Research, v37, 71-87, 1987

Toteu, S.F., Van Schmus, W.R., Penaye, J. & Michard, A., New U-Pb and Sm-Nd data from north-central Cameroon and its bearing on the pre-Pan African history of central Africa, Precambrian Research, V108, 45-73, 2001

Toteu, S.F., van Schmus, W.R., Penaye, J. & Nyobe, J.B., U-Pb and Sm-Nd evidence for Eburnian and Pan-African high-grade metamorphism in cratonic rocks of southern Cameroon, Precambrian Research, V67, 321-347, 1994

Turner, D.C. & Rex, D.C., Volcaniclastic carbonatite at Kaluwe, Zambia: age and relations to sedimentary rocks in the Zambezi rift valley, Journal of the Geological Society, London, V148, 13-15, 1991

Ukstins, I.A., Renne, P.R., Wolfenden, E., Baker, J., Ayalew, D. & Menzies, M., Matching conjugate volcanic rifted margins: 40Ar/39Ar chrono-stratigraphy of pre- and syn-rift bimodal flood volcanism in Ethiopia and Yemen, Earth and Planetary Science Letters, V198, 289-306, 2002

Umeji, A.C. & Caen-Vachette, M., Geochronology of Pan-Africa Nassarawa Eggon and Mkar-Gboko granites, southeast Nigeria, Precambrian Research, V23, 317-324, 1984

Umeji, A.C. & Caen-Vachette, M., Rb-Sr isochron from Gboko and Ikyuen rhyolites and its implications for the age and evolution of the Benue trough, Nigeria, Geological Magazine, V120, No6, 529-650, 1983

Underdown, R., Redfern, J. & Lisker, F., Constraining the burial history of the Ghadames Basin, North Africa: an integrated analysis using sonic velocities, vitrinite reflectance data and apatite fission track age, Basin Research, 2007, V19, 557-578

Vail, J.R., Alkaline ring complexes in Sudan, Journal of African Earth Sciences, V3, No1/2, 51-59, 1985

Veldkamp, A., Buis, E., Wijbrans, J.R., Olago, D.O., Boshoven, E.H., Maree, M. & Berg van Saparoea, R.M. van den, Late Cenozoic fluvial dynamics of the River Tana, Kenya, an uplift dominated record, Quaternary Science Reviews, V26, 2897-2912, 2007

Verati, C., Bertrand, H. & Feraud, G., The farthest record of the Central Atlantic Magmatic Province into West Africa craton: Precise 40Ar/39Ar dating and geochemistry of Taoudenni basin intrusives (northern Mali), Earth and Planetary Science Letters, V235, 391-407, 2005

Wandji, P.K., Tchokona Seuwui, D., Bardintzeff, J.-M., Bellon, H. & Platevoet, B., Rhyolites of the Mbepit massif in the Cameroon volcanic line: an early extrusive volcanic episode of Eocene age, Mineral. Petrol., V94, 271-286, 2008

Wasserburg, G.J., Craig, H., Menard, H.W., Engel, a.E.J. & Engel, C.G., Age and composition of a bounty islands granite and age of a Seychelles islands granite, Journal of Geology, V71, No6, 785-789, 1963

Watkins, N.D., Gunn, B.M., Nougier, J. & Baksi, A.K., Kerguelen: continental fragment or oceanic island?, Geological Society of America Bulletin, V85, 201-212, 1974

Weis, D., et al., Trace of the Kerguelen mantle plume: evidence from seamounts between the Kerguelen archipelagoe and Heard Island, Indian ocean, Gcubed, V3, No6, 2002

Weis, D., Liegois, J.P. & Black, R., Tadhak alkaline ring-complex (Mali): existence of U-Pb isochrons and "Dupal" signature 270 Ma ago, Earth and Planetary Science Letters, V82, 316 - 322, 1987

Williams, F.M., Williams, M.A.J. & Aumento, F., Tensional fissures and crustal extension rates in the northern part of the Main Ethiopian Rift, Journal of African Earth Sciences, V38, 183-197, 2004

Woldegabriel, G., Yemane, T., Suwa, G., White, T. & Asfaw, B., Age of volcanism and rifting in the Burji-Soyoma area, Amaro Horst, southern Main Ethiopian Rift: geo- and biochronologic data, Journal of African Earth Sciences, V13, No 3/4, 437-447, 1991

Wolfenden, E., Ebinger, C., Yirgu, G., Deino, A. & Ayalew, D., Evolution of the northern Main Ethiopian rift: birth of a triple junction, Earth and Planetary Science Letters, V224, 213-228, 2004

Woolley, A.R., Alkaline rocks and carbonatites of the world - Part 3: Africa, Geological Society London, 2001

Yamba, T.K. & Boven, A., Evolution Pliocene et Quaternaire du remplissage sedimentaire dans le sud du bassin du lac Edouard, branche occidentale du Rift Est-Africain, Journal of African Earth Sciences, V26, No3, 423-439, 1998

Zanettin, B., Bellieni, G. & Justin Visentin, E., New radiometric age of volcanic rocks in the central Eritrean plateau (from Asmara to Adi Quala): Considerations on stratigraphy and correlations, Journal of African Earth Sciences, V45, 156-161, 2006

Zumbo, V., Feraud, G., Bertrand, H. & Chazot, G., 40Ar/39Ar chronology of Tertiary magmatic activity in Southern Yemen during the early Red Sea-Aden rifting, Journal of Volcanology and Geothermal Research, V65, 265-279, 1995

Zumbo, V., Feraud, G., Vellutini, P., Piguet, P. & Vincent, J., First 40Ar/39Ar dating on Early Pliocene to Plio-Pleistocene magmatic events of the Afar-Republic of Djibouti, Journal of Volcanology and Geothermal Research, V65, 281-295, 1995