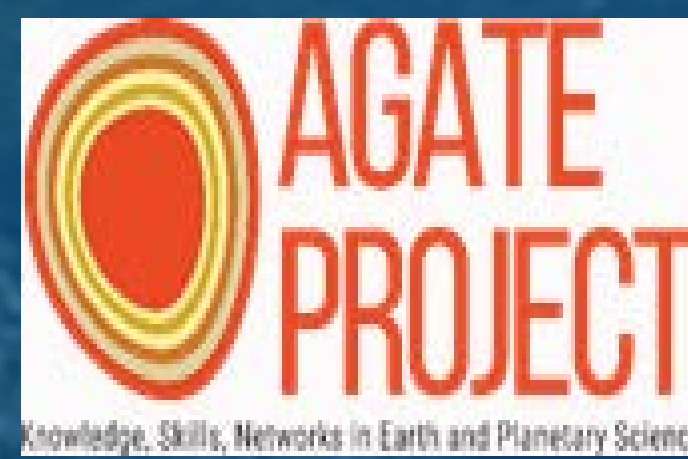


# The International Association for Structural Geology and Tectonics Conference



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## U-Pb baddeleyite ages and petro-geochemical characteristics of San-Pedro doleritic dykes swarm (South-West of Côte d'Ivoire): newly identified 182 Ma event in the southern West Africa Craton

Jean-Louis Nabi<sup>1</sup>, Martial Pohn Koffi Adingra<sup>1</sup>, Augustin Yao Koffi<sup>1</sup>, Lenka Baratoux<sup>1,2</sup>, Steven Denyszyn<sup>3</sup>, Mark W. Jessell<sup>4</sup>, Alexis Salting<sup>4</sup>, Marc Ephrem Allialy<sup>1</sup>, Richard E. Ernst<sup>5</sup>, Mathieu Benoit<sup>2</sup>.

<sup>1</sup> University Felix Houphouët-Boigny of Cocody-Abidjan (UFHB), UFR Earth Sciences and Mineral Resources, 22 BP 582 Abidjan 22, Côte d'Ivoire. Tel/Fax: +225 22-48-38-03.

<sup>2</sup> Laboratoire GET, Université Toulouse 3 Paul Sabatier, IRD, CNRS UMR 5563, Observatoire Midi-Pyrénées, 31400 Toulouse, France.

<sup>3</sup> Earth Sciences, Memorial University of Newfoundland, St. John's, A1B 3X5, Canada.

<sup>4</sup> Centre for Exploration Targeting, The University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, Australia.

<sup>5</sup> Department of Earth Sciences, Carleton University, Ottawa, ON K1S 5B6, Canada.

### 1.Introduction

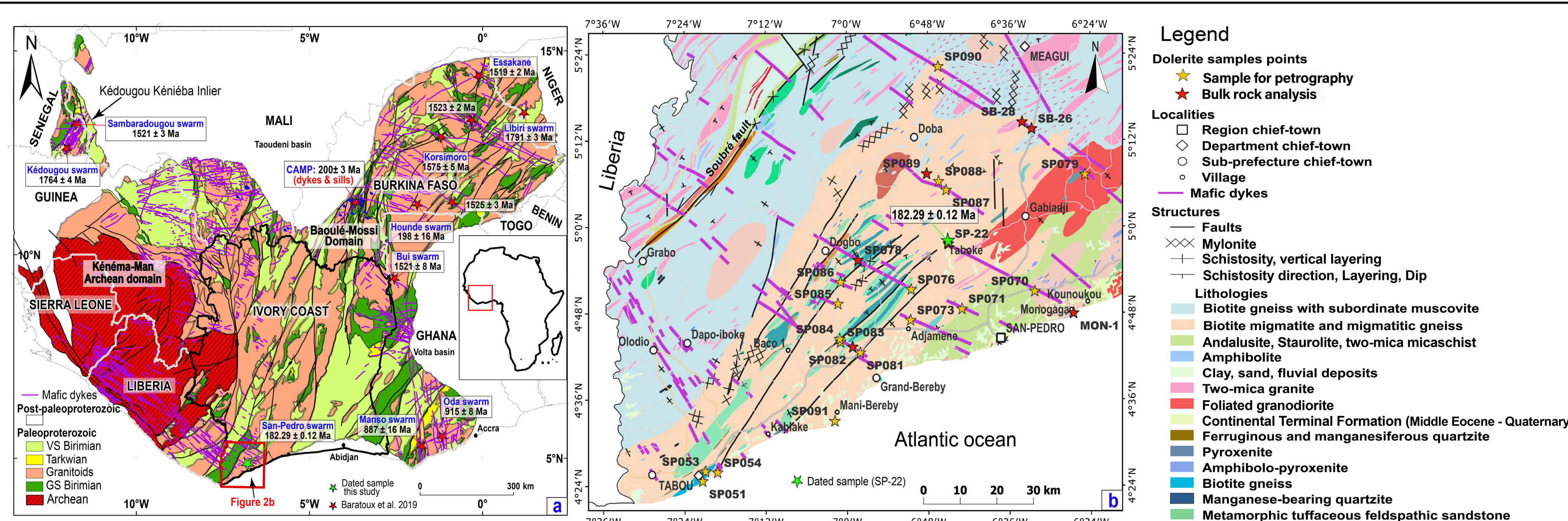


Fig. 1: (a) Simplified regional geological and mafic dykes swarms distribution map showing (b) San-Pedro doleritic swarm issued from study area (Côte d'Ivoire).

### 2.Methodology

**Petrology and mineralogy:** Seven samples of dykes doleritic were collected in the field, four representative polished thin sections and analysed by electron probe microanalyser (EPMA) in order to characterize the mineral compositions.

**Geochronology U-Pb (ID-TIMS) baddeleyites:** one sample of doleritic dyke from San-Pedro mafic swarm was dated with precision. This datation yielded a age of  $182.29 \pm 0.12$  Ma

**Geochemistry (ICP-MS) on whole rock:** Seven samples of doleritic dyke of San-Pedro swarm have been analyzed on whole rock (ICP-MS and ICP-AES) to Bureau Veritas Minerals (BVM) in Canada and ALS in Spain in order to characterize major, trace and rare earth elements, respectively and to constrain the geochemical signatures and geodynamic setting of their emplacement. Finally, we correlate them with mafic dykes swarms of others world regions.

### 3.Results

#### 3.1.Petrology and Mineralogy



Fig. 2: San-Pedro doleritic dykes swarm field photographs and microphotographs: minerals abbreviation (Warr 2021).

#### 3.2.Geochemistry

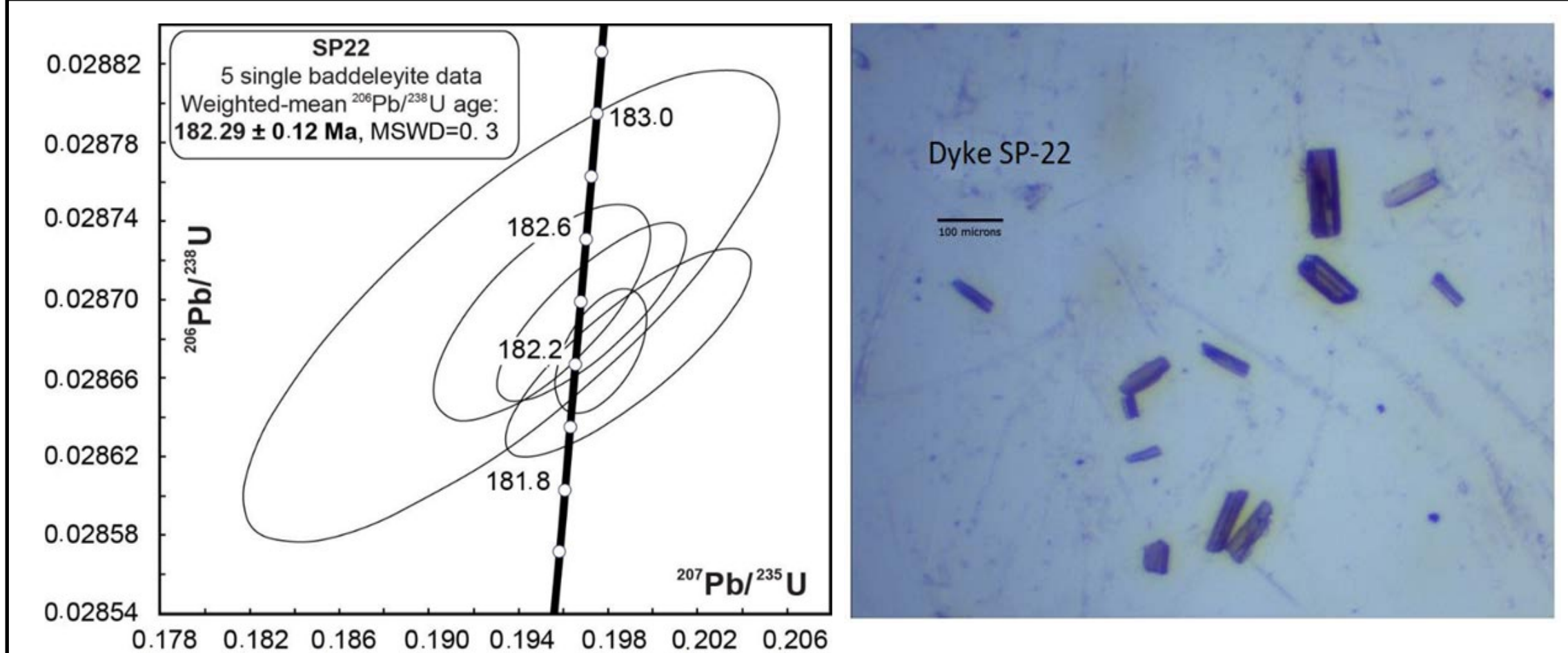


Fig. 3 : Concordia plot of ID-TIMS U-Pb analysis of on baddeleyites

#### 3.3.Geochemistry

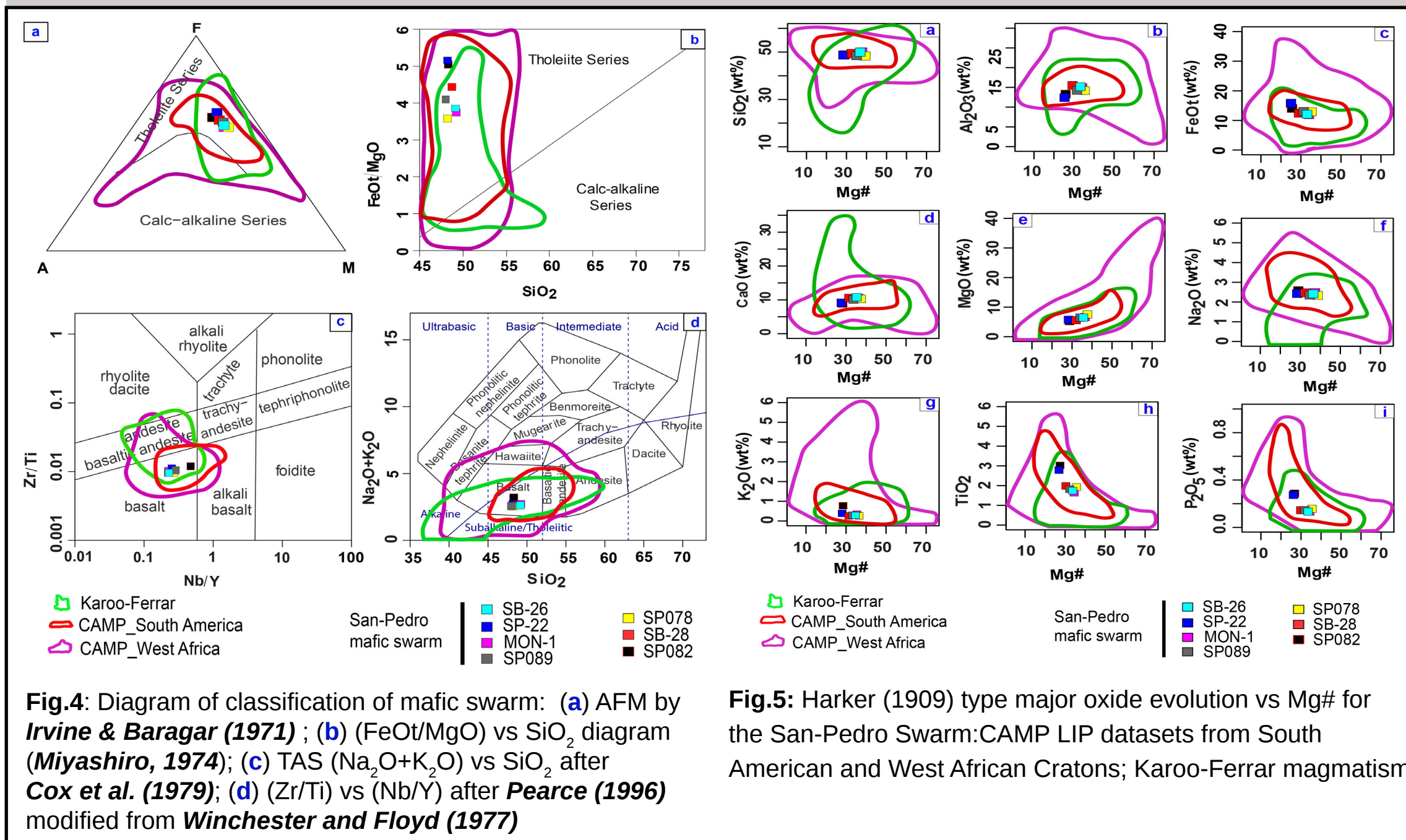


Fig.5: Harker (1909) type major oxide evolution vs Mg# for the San-Pedro Swarm: CAMP LIP datasets from South American and West African Cratons; Karoo-Ferrar magmatism

### 4.Discussion

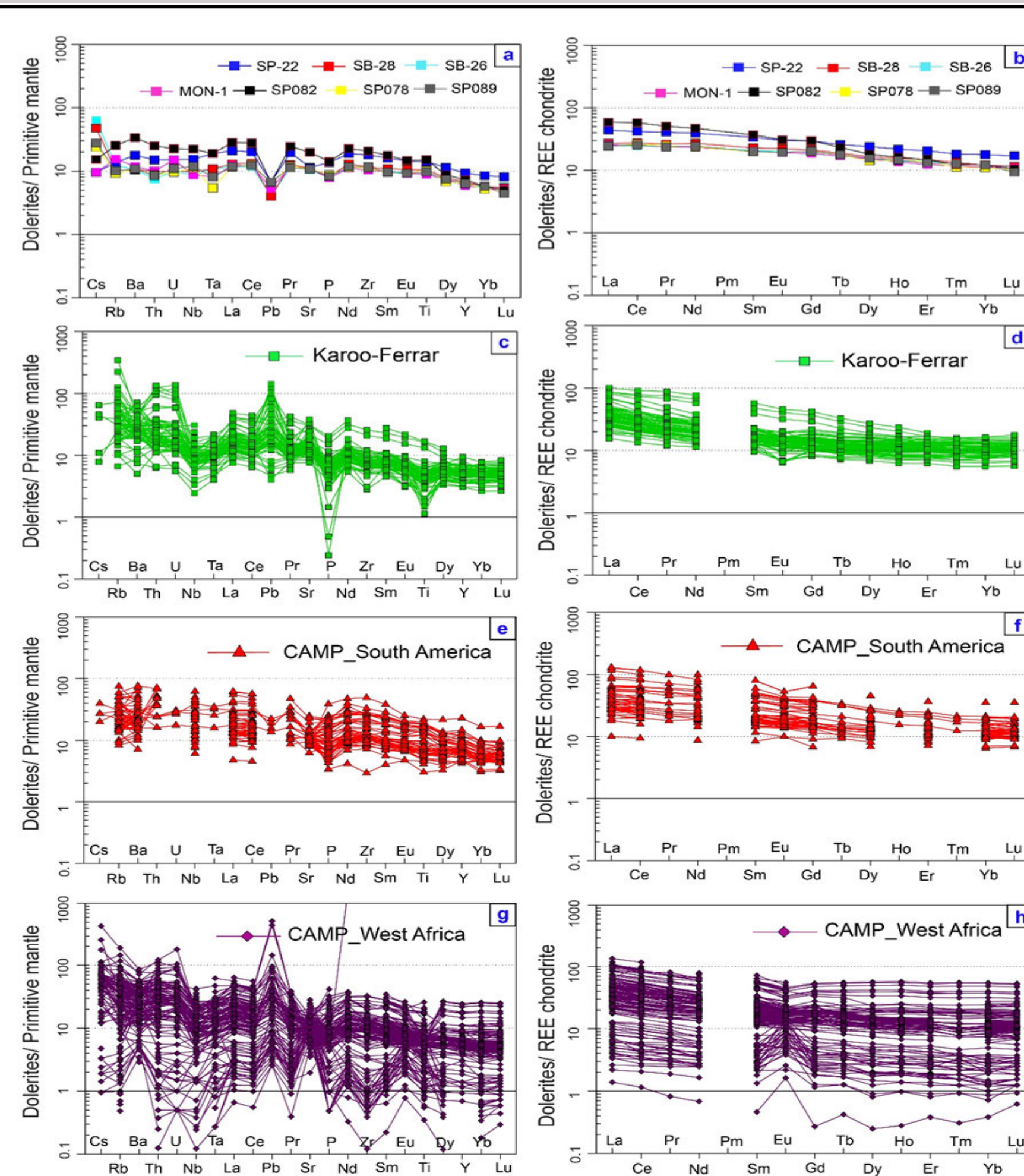


Fig 6. (a,b) San-Pedro doleritic dykes swarm from Côte d'Ivoire; (c,d) Karoo-Ferrar mafic dykes swarms and sills Provinces (Botswana, South Africa); (e,f) CAMP LIP event South America Craton and (g, h) CAMP event West Africa Craton multi-elements patterns normalized to primitive mantle (McDonough & Sun 1995) and chondrite (Boynton 1984)

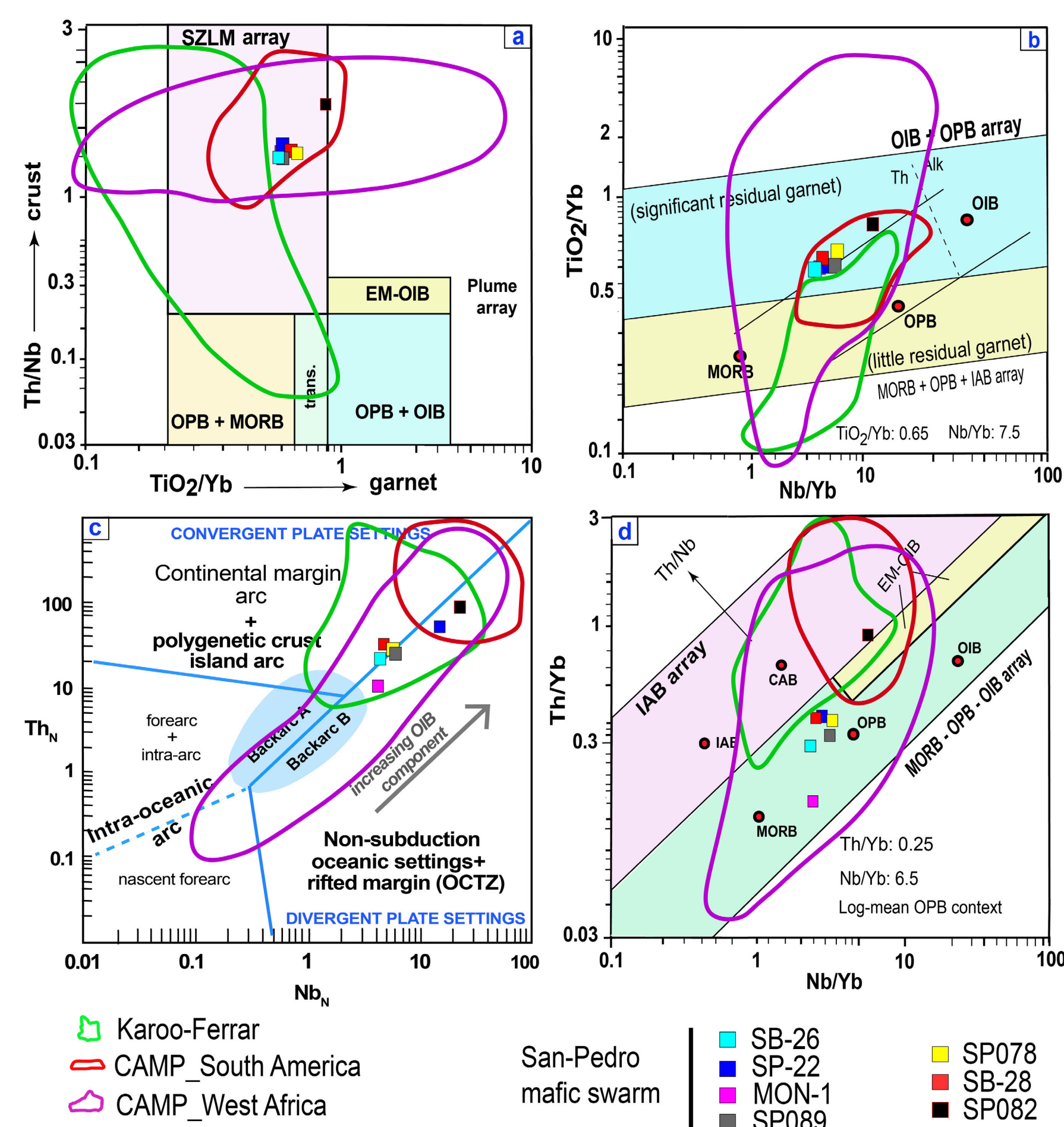


Fig 7. Binary geodynamic setting diagrams: (a) (Th/Nb) versus (TiO<sub>2</sub>/Yb) diagram (Pearce et al. 2021); (b) TiO<sub>2</sub>/Yb versus Nb/Yb diagram; (c) NbN versus ThN diagram; (d) (Th/Yb) versus (Nb/Yb) binary diagram

### 5.Conclusion

The dolerites of southwestern Côte d'Ivoire are oriented NW-SE and generally correspond to continental tholeiitic basalts. Microscopic observations reveal an intergranular texture with a primary mineral composition consisting of plagioclase, clinopyroxene, orthopyroxene, and ferro-titanium (Fe-Ti) oxide, accompanied by secondary paragenesis, notably sericite, chlorite, granophyre, biotite, and green hornblende. Geochemistry confirms that these mafic rocks are characteristic of an origin from the deep, primitive asthenospheric mantle. The geochemical signatures indicate a continental intraplate geodynamic setting with enrichment in LREE relative to HREE. The Harker (1909) plots of major and trace oxides versus Mg# (25–40%) applied to the dolerites studied from the San Pedro swarm (Fig. 5) suggest relatively differentiated magmatism. The geochemical signatures indicate a continental intraplate geodynamic setting with an enrichment of LREE relative to HREE. The geodynamic evolution of the magma is supported by the ratios (La/Yb)<sub>N</sub>:3.02 to 7.17 and TiO<sub>2</sub>/Yb (0.5 - 1) whose characteristics are consistent with those of the CAMP in West Africa (West African Craton); also CAMP of South America (Amazonian Craton) and French Guiana. A sample from the San-Pedro swarm (SP-22) was dated to  $182.29 \pm 0.12$  Ma. This U-Pb-ID-TIMS badeleyite age indicates a recent Mesozoic (Triassic–Jurassic) magmatic event similar to the Karro-Ferrar volcanic event in South Africa and New Zealand, Tasmania and Antarctica.

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