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Origin and significance of the antimony mineralisation associated to mafic intrusions in the Iberian Zone and the Central Armorican Domain

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In the Central Iberian Zone (CIZ) and its French counterpart, the Central Armorican Domain (CAD), widespread swarms of mafic dykes with various ages and compositions are known. Indeed, numerous mafic events are recognized in the late Neoproterozoic, in the Cambrian to the Ordovician, in the Ordovician to the Devonian, at the Devonian-Carboniferous boundary, in the Permian and in the Jurassic. Such a succession of mantle partial melting events, localised or generalized, may have strong consequences (i) on the composition and the homogeneity of the mantle below both the CIZ and CAD, and (ii) on the transfert of metals in the overlying crust. Moreover, the mantle below these domains must have been modified also by the subduction of large to small oceanic crusts from the Iapetus, the Rheic, the Galicia-Moldanubian and the Paleo-tethys. Although the occurrences of paleo-subductions below the CIZ and CAD remain discussed, the southern border of the CIZ, the Ossa-Morena Zone (OMZ), is considered as a suture zone resulting from a subduction followed by a collision between 390 and 360 Ma (D1), according to the 2 opposite structural vergences at the CIZ/OMZ boundary, as well as the location of a NE-dipping slab imaged by seismic profiles. In the Armorican massif, the end of subduction is also dated at 360 Ma and associated to a north-directed subduction. The trace of this subduction below the CAD is visible in the tomographic dataset. Interestingly, these two domains (CIZ and CAD) contain the largest number of Palaeozoic antimony deposits, antimony being a volatile element. In these domains, the large clustering of antimony deposits and occurrences is observed within a ca 100km wide bands along their southern parts. In the two domains, the antimony deposits are frequently spatially associated with diabase dykes. Diabase dykes and associated antimony mineralisation have been dated at 360 Ma in the CAD but remain temporally unconstrained in the CIZ. Nevertheless, since these dykes are strongly affected by the Variscan deformation a minimum age of 350 Ma is inferred. Both, the peculiar composition of these diabase dykes, relatively enriched in Cs, Li, Pb and relatively depleted in K and Rb, the spatial association with antimony at the end of a 360Ma subduction, suggest a link between antimony and a ca 360Ma mafic magmatism which could result from the partial melting of a subduction-related metasomatized mantle.

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