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# ABSTRACT BOOK

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Il tempo del pianeta Terra  
e il tempo dell'uomo:  
Le geoscienze fra passato e futuro



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## Subduction-related volatiles involved in the genesis of Cenozoic primary alkaline melts in Northern Victoria Land

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**Keywords:** Melt inclusions, Northern Victoria Land (Antarctica), H<sub>2</sub>O content, CO<sub>2</sub> content, primary magmas.

The West Antarctic Rift System (WARS) is an almost unique site where to investigate the complex relationships between the migration of fluid in the mantle wedge after prolonged subduction, the LIP magmatism and the rifting process with related magmatism. It is likely to infer that the last two episodes could be related to the large quantity of volatile introduced into the mantle during the first event. As it is well known, in fact, fluids reduce the solidus temperature allowing a larger melt production.

Major, trace element and volatiles (CO<sub>2</sub>, H<sub>2</sub>O, F, Cl and S) of olivine-hosted melt inclusions (MI) embedded in Cenozoic basanite and basalt from Northern Victoria Land (NVL) provide us new insights on the composition of primary melts and of the mantle source in the complex framework of the tectonic evolution of this part of Antarctica over the last 500 Ma.

MI comes from Shield Nunatak (Mt. Melbourne), Eldridge Bluff and Handler Ridge and are enclosed in Fo<sub>89-82</sub> olivine. Before being analyzed the inclusion were homogenized at HT (1300°C) and HP (6 kbar). Despite a larger variability, MI are compositionally comparable with the lavas of the West Antarctic Rift System that range from basanite to basalt (41.23-48.64 wt% SiO<sub>2</sub>; 7.66-14.15 wt% MgO; 2.78-5.79 wt% Na<sub>2</sub>O+K<sub>2</sub>O). The MI primary feature is testified by high Mg# and Fo content in host olivine, as well as by observed negative correlations between typical differentiation parameters (SiO<sub>2</sub>, MgO and Mg#) and the concentration of highly incompatible element (K<sub>2</sub>O; Zr; La), highlighting that chemical heterogeneities are mostly related to melting processes and/or source characteristics.

Primitive mantle normalized trace element diagram show a typical intraplate pattern characterized by positive K, Nb and Ti and negative Pb anomalies.

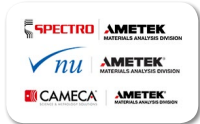
The H<sub>2</sub>O and CO<sub>2</sub> contents range from 0.70 to 2.64 wt% and from 25 to 341 ppm respectively. At a water content of 1.2 wt% few samples show CO<sub>2</sub> values up to 3905 ppm with a H<sub>2</sub>O/(H<sub>2</sub>O+CO<sub>2</sub>) molar ratio down to 0.8, suggesting that many MI underwent CO<sub>2</sub> degassing. Applying this ratio to the MI with the highest water content result in an estimation of a minimum of 8800 ppm of CO<sub>2</sub> in the basanitic melts. F and Cl content varies from 1386 to 10 ppm and from 1336 to 38 ppm respectively. An extensive dataset on volatile and trace element content in MI has been used to constrain the origin of our MI. The comparison are consistent with melt derivation from lithospheric mantle modified by subduction-related fluids.

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