Subduction-related melts in the Alboran Mantle: The Tallante Xenoliths (B. Cordillera, SE Spain)

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The Alboran Sea region has been affected since the late Oligocene by a sequence of tholeiitic, calc-alkaline and alkaline magmatic events, related to lithospheric extension beneath the Alboran domain, as a consequence of slab roll-back. Mantle xenoliths from the Cabezo Tallante Late Neogene volcanic center (SE Spain) record a multi-stage history of melt-rock interaction and melt intrusion tracking an extension-related 30 km uplift, concomitant to the observed transition from subduction-related to alkaline magmatism. Diffuse tholeiitic melt percolation at spinel- and plagioclase-facies mantle depths was followed by rather shallow (0.7-1 GPa) intrusion of cm-sized gabbronoritic veins. The latters show a fine-grained orthopyroxene reaction rim against the host peridotite. Comparable gabbronorites were previously ascribed to slab-derived melts [1, 2]. A remarkable feature in these veins is the diffuse occurrence of Cl-apatite microcrystals in plagioclase. Clinopyroxene in the host peridotite, partly corroded by gabbronoritic apophyses, is significantly enriched in Th, U, L-M-REE, relative to cpx in both sp-and plag-peridotites, whereas they preserve low Nb and Ta contents. Plag and opx in the vein are also LREE-enriched. These features indicate that parental melts to the gabbronoritic veins were Si-saturated, enriched in LILE and volatile (Cl) components and depleted in Nb, Ta, consistent with subduction-related melts. The gabbronorite stage was followed by the intrusion of alkaline amphibole pyroxenites. According to recent models [3], we propose that lithosphere extension led to uplift and migration of lithospheric mantle sectors (as the mantle presently sampled at Tallante) from an inner part of the mantle wedge, where they experienced spinel-facies porous melt flow, towards a position above a slab edge or slab detachment zone. This allowed upwelling of hot asthenosphere, which generated the alkaline magmatism, and possibly induced melting of the subducting slab [4].

[1] Arai *et al*. (2003) *Proc. Jap. Acad.* **79**, 145-50. [2] Beccaluva *et al*. (2004) *Lithos* **75**, 67-87. [3] Duggen *et al*. (2005) *J.Petrol* **46** (6), 1155-1201. [4] Yogodzinski *et al*. (2001) *Nature* **409**, 500-502.

Soil and water analysis of selected areas in vicinity of brick kilns along the highway of Rawalpindi and Islamabad

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The research was conducted to determine the effect of 35-40 brick kilns in an area of 4-5 sq.m on the soil and water contamination in its vicinity and surrounding area. Sampling was done along the highway of Rawalpindi and Islamabad. Twenty (20) soil samples at the depth of 0-6 inches and 6-12 inches were collected. Fifty water samples (50) ranging in depth of 50-400m were collected. All soil and water samples were analyzed for different physiochemical parameters. Results of soil analysis shows high pH (max. 8.55) and high EC (max. 1890 uS/cm) values. Heavy metal analysis shows that all soil samples are high in Pb concentration than permissible limits of WHO (3 mg/l). Similarly Cu concentration of all soil samples exceeds permissible limits of WHO (0.5 mg/l). Water analysis showed high pH (max.8.9), EC (max. 4750 uS/cm), TDS (max. 3515 mg/l), turbidity (max. 196 NTU), alkalinity as bicarbonate (HCO_3^-) (max. 1293 mg/l), total hardness (max. 748 mg/l) and calcium (max. 652 mg/l). Piper plot shows that water of brick kiln areas is of Na^+-HCO_3^- -SO_4^{2-} type. During the survey of brick kiln areas, health effects were also noticed. People dwelling in the areas are suffering from various respiratory and dental diseases.