# Temporal and seasonal variation in tubewell water arsenic concentrations in Matlab, Bangladesh

M. JAKARIYA[1]*, S.N. RAHMAN[1], P. BHATTACHARYA[2], M. RAHMAN[3], M. VON BRÖMSSEN[2,4], L.-Å. PERSSON[5] AND M. VAHTER[6]

[1]NGO Forum for Drinking Water Supply and Sanitation, Dhaka-1207, Bangladesh (*correspondence: jakriya@ngof.org)
[2]KTH-International Groundwater Arsenic Research Group, Dept. of Land and Water Resources Engineering, KTH), SE-100 44 Stockholm, Sweden
[3]ICDDR, B: Centre, Dhaka, Bangladesh
[4]Ramböll AB, Box 4205, SE-102 65 Stockholm, Sweden
[5]International Maternal and Child Health (IMCH), Uppsala University, Uppsala, Sweden
[6]Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden

The trends of temporal and seasonal variability of As concentrations were evaluated with the hydrological attributes in Matlab Upazila, Southeastern Bangladesh. Concentrations of arsenic (As) were screened in the functioning tube-wells (n=13,286). In more than 70% of the tubewells As concentration exceeded 10 µg/L, and 60% exceeded 50 µg/L [1] Here we present the salient results of the patterns of temporal and seasonal variability of As concentration in 51 tubwell water sources over a period of four years between 2002 to 2005, monitored thrice a year. Mean As concentrations were higher in the tubewells during the monsoon period (June-August) than in winter season (November-December) during the two years: 2002 (158 µg/L, 139 µg/L) and 2003 (136 µg/L, 106 µg/L). During 2004, a reverse trend was observed (120 µg/L, 124 µg/L) and in 2005 the concentrations were almost identical (116 µg/L, 115 µg/L). The variability in the As levels in tubewell water during the dry and wet seasons were variable: 19 µg/L (t=0.97, P=0.33), 30 µg/L (t=3.59, P=0.001), -4.2 µg/L (t=0.56, P=0.57), and 1.6 µg/L (t=0.13, P=0.89) in 2002, 2003, 2004 and 2005 respectively. On the other hand, mean temporal change in As concentration in the tubewell water decreased during the study period (P=0.003). Moreover, the changes in As concentrations were comparatively higher in tubewells with As concentration >50 µg/L than those with As levels <50 µg/L. Fluctuation in As concentration indicated close relationship with the groundwater level fluctuations.

[1] Jakariya *et al.* (2007) *STOTEN* **379**, 167-175

# Phlogopite-bearing fossil plume and EM II component evidences in Patagonia, registered in alkaline basalts from Southern Argentine (36°S - 44°S)

T.L.R. JALOWITZKI[1]*, R.V. CONCEIÇÃO[1], Y. ORIHASHI[2], G.W. BERTOTTO[3] AND F. GERVASONI[1]

[1]Geoscience Institute, UFRGS, Porto Alegre - RS, Brazil (*correspondence: tiago.jalowitzki@ufrgs.br) (rommulo.conceicao@ufrgs.br)
[2]Earthquake Research Institute, The University of Tokyo, Tokyo, Japan (oripachi@eri.u-tokyo.ac.jp)
[3]CONICET – Universidad Nacional de La Pampa, Santa Rosa - La Pampa, Argentina (gwbertotto@yahoo.com.ar)

The Patagonian Volcanic Field composed of late Cretaceous to Quaternary volcanism is widely distributed in a continental extra back-arc geotectonic environment (e.g., [1]). Eleven monogenetic volcanoes accompanied with ultramafic xenoliths are situated from 36°13′S to 44°52′S, and were selected to be studied. These volcanoes are dominantly composed of basanite to alkaline basalt, which are divided into two groups, based on mineralogy, geochemical and isotope compositions. The Group I shows low SiO2 concentration than Group II and both Groups present similar variation in REE patterns (LREE > HREE), but Group I has LREE > HREE compared to Group II. Group II shows HFSE depletion with Ba, Pb and Sr enrichment in the spidergram, while Group I shows Rb and K depletion with HFSE enrichment. The Rb, K and HREEs depletion suggests that the Group I source might be derived from phlogopite-bearing garnet peridotite. Group I alkaline basalts have lower $^{87}Sr/^{86}Sr$ (Group I = ~0.703; Group II = ~0.704) and similar εNd (Group I = 3.57 to 6.74; Group II = 0.99 to 5.62) and $^{143}Nd/^{144}Nd$ (Group I = 0.51282 to 0.51298; Group II = 0.51268 to 0.51292) values, compared to Group II ones. Geochemical trends; incompatible element behavior (e.g. Ba/Nb, Pb/Ce; Group I < Group II) and REE suggest that Groups I and II originated from the similar sub-continental mantle sources, but were undergone to different metasomatism processes. Groups I and II were generated by nearly <3% melting of an OIB-like garnet peridotite, but the Group II has enriched mantle (EMII) characteristics possibly inherited from on-going subduction-related metasomatism, while Group I demonstrates the OIB-like signature, which might result from phlogopite-bearing fossil plume in the subcontinental lithosphere.

[1] Stern *et al.* (1990) *CMP* **104**, 294–308.