Geochemical characterisation of hypersaline anoxic brine basins from eastern Mediterranean Sea

CLAUDIA E. CASALINO AND GERT. J. DE LANGE

Faculty of Geosciences, Utrecht University, The Netherlands

Amongst the most extreme deep marine environments found on Earth are the hypersaline anoxic brine basins in the Eastern Mediterranean. These are characterized not only by their high pressure and density, but also by their distinct redox interfaces, high salt, methane, and sulphide contents. These hypersaline anoxic brine lakes resulted from the dissolution of subterranean late-Miocene salt deposits [1].

Despite these extreme conditions and the limited exchanges between brine and overlying seawater, several microbe communities have developed [2].

Chemically all brine basins are distinguished by elevated methane concentrations ranging from 0.1 to > 10 mM (or 50.000 to >5.000.000 times background seawater methane concentration). In addition, distinct differences occur in sediment composition between the various basins, which may in part be related to differential preservation of suspended matter fluxes, to early diagenetic reactions and the production of minerals, and to different brine composition and density.

Preliminary results from a multidisciplinary study of water and sediment samples collected during the 2008 DOPPIO cruise with RV Pelagia will presented.

[1] Camerlenghi (1990) *Mar. Chem.* **31**, 1-19. [2] Van der Wielem *et al.* (2005) *Science* **307**, 121-123; Daffonchio *et al.* (2006) *Nature* **440**, doi:10.1038.

Geogenic trace elements in groundwaters in the Mt Etna region: Geostastistical, proteomic and epidemiological approaches to assessing human exposure and health risks

C. CASCIO[1,2], L. RODRIGUEZ-LADO[2], D.A. POLYA[3], M. ZAPPIA[4], F. PATTI[4], A. NICOLETTI[4], R.O. JENKINS[1] AND P.I. HARIS[1]*

[1]Faculty of Health and Life Sciences, De Montfort University, Leicester, LE1 HB9 UK
(*correspondence: pharis@dmu.ac.uk)
[2]Formerly EC-DG JRC, IES, I-21027 Ispra , Italy
[3]SEAES, University of Manchester, M13 9PL, UK
[4]Department of Neurosciences, Catania Univ., Italy

Approximately 1,000,000 people live the region of Mt Etna and rely upon local groundwaters as their main drinking water source. Volcanic CO_2 in the aquifer is thought to result in leaching of geogenic elements into the groundwater [1] with concentrations of trace elements (TEs) such as Mn, As, V, Fe and Se, often exceeding the National/EU MCL/PV for drinking water [1, 2]: however no comprehensive study of associated health risks has been published to our knowledge..

We present a study of TE hazard in groundwater and exposure assessment as a foundation for assessing TE-attributable human health risks in this population. Hazard distribution was modelled geostatistically from point data. Population characterization, including food and water consumption habits, was determined via questionnaires. To determine biomarkers of exposure, hair, nails and urine have been collected from a small community in Mt. Etna (Linguaglossa) where a possible Multiple Sclerosis cluster has been reported by Nicoletti *et al.* [3]. ICP-MS and AAS is being used to determine total TE concentrations in hair, nails and urine, whilst proteomic analyses of urine (MALDI-TOF and 2D-PAGE) have been performed to reveal new biomarkers of exposure and/or pathology.

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[1] Aiuppa *et al.* (2000) *Geochim Cosmochim Acta* **64**, 1827-1841. [2] Roccaro *et al.* (2007). *Desalination* **210**, 205. [3] Nicoletti *et al.* (2009) *Multiple Sclerosis* **15**, 129.