

Applied Geochemistry, 74, (2016) 109 - 121

Use of GEMAS data for risk assessment of cadmium in European agricultural and grazing land soil under the REACH Regulation

Manfred Birke ^{a,*}, Clemens Reimann ^b, Koen Oorts ^c, Uwe Rauch ^d, Alecos Demetriades ^e, Enrico Dinelli ^f, Anna Ladenberger ^g, Josip Halamic ^h, Mateja Gosar ⁱ, Fabian Jahne-Klingberg ^a, The GEMAS Project Team¹

^aFederal Institute for Geosciences and Natural Resources (BGR), Stilleweg 2, D-30655, Hannover, Germany

^bGeological Survey of Norway(NGU), P.O. Box 6315 Sluppen, 7491, Trondheim, Norway

^cARCHE, Liefkensstraat 35D, 9032, Gent (Wondelgem), Belgium

^dFederal Institute for Geosciences and Natural Resources (BGR), Berlin Branch, Wilhelmstrasse 25e30, D-13593, Berlin, Germany

^eInstitute of Geology and Mineral Exploration (IGME), Spirou Louis Street 1, 13677, Acharnae, Greece

^fDepartment of Biological, Geological and Environmental Sciences, University of Bologna, Bologna, Italy

^gGeological Survey of Sweden (SGU), Box 670, SE-75128, Uppsala, Sweden

^hCroatian Geological Survey, Department of Geology, Sachsova ul. 2, 1000, Zagreb, Croatia

ⁱGeological Survey of Slovenia, Dimiceva 14, SL-1000, Ljubljana, Slovenia

Over 4000 soil samples were collected for the “Geochemical Mapping of Agricultural and Grazing Land Soil of Europe” (GEMAS) project carried out by the EuroGeoSurveys Geochemistry Expert Group. Cadmium concentrations are reported for the <2 mm fraction of soil samples from regularly ploughed fields (agricultural soil, Ap, 0 - 20 cm, N - 2218) and grazing land soil (Gr, 0 - 10 cm, N - 2127). The samples were collected in 33 European countries, covering 5.6 million km² at a sample density of 1 sample each per 2500 km² and were analysed in an aqua regia extraction followed by an ICP-MS finish. The median Cd value is 0.181 mg/kg for the Ap and 0.202 mg/kg for the Gr soil samples. The data allow a directly comparable country-specific regional exposure and risk characterisation for all EU countries covered. Direct risks of Cd for terrestrial organisms are only predicted for a few isolated sample sites: 2.3% of the Ap and 4.5% of the Gr sites, respectively.

1 The GEMAS Project Team: S. Albanese, M. Andersson, R. Baritz, M.J. Batista, A. Bel-Ian, D. Cicchella, B. De Vivo, W. De Vos, M. Duris, A. Dusza-Dobek, O.A. Eggen, M. Eklund, V. Ernsten, P. Filzmoser, D.M.A. Flight, S. Forrester, U. Fügedi, A. Gilcucis, V. Gregorauskiene, W. De Groot, A. Gulan, E. Haslinger, P. Hayoz, J. Hoogewerff, H. Hrvatovic, S. Husnjak, L. Janik, G. Jordan, M. Kaminari, J. Kirby, V. Klos, P. Kwecko, L. Kuti, A. Lima, J. Locutura, P. Lucivjansky, A. Mann, D. Mackovych, M. McLaughlin, B. I. Malyuk, R. Maquil, R.G. Meuli, G. Mol, P. Negrel, P. O'Connor, R.T. Ottesen, A. Pasniecna, V. Petersell, S. Pfeleiderer, M. Ponavic, C. Prazeres, S. Radusinovic, I. Salpeteur, R. Scanlon, A. Schedl, A. Scheib, I. Schoeters, P. Sefcik, E. Sellersjo, I. Slaninka, J.M. Soriano-Disla, A. Sorsa, R. Svrkota, T. Stafilov, T. Tarvainen, V. Tendavilov, P. Valera, V. Verougstraete, D. Vidojevic, Z. Zomeni, A. Zissimos