Current Status of Applied Geochemistry Research in Southern Europe

MARCH 2020

Report of Regional Councillor (B. De Vivo)- Activities in Italy and within EuroGeoSurveys Geochemistry Expert Group (2018-2020)

The EuroGeoSurveys Geochemistry Expert Group (EGS-GEG) has at present 53 official EGS members, and including associate members, from outside organisations, more than 70 scientists participate in the activities of the group. The group closely cooperates with colleagues from the USGS (David Smith) and Geoscience Australia (Patrice de Caritat), where comparable continental scale geochemical mapping programmes are presently carried out.

The mission of the EGS-GEG is to provide high quality geochemical data of near-surface materials, to develop harmonised data bases for multi-purpose use, and to provide independent expert advice to the European Commission. To achieve this mission, systematic geochemical data for the whole of Europe are generated by harmonised methods of sampling of near-surface materials (soil, stream or floodplain sediment, water), sample preparation, chemical analysis, quality control, data processing and presentation. The systematic geochemical information is published in the form of geochemical atlases, which are freely available, and can be used for (a) state of the environment reports, (b) mineral exploration, (c) agriculture, (d) forestry, (e) animal husbandry, (f) medical geology, (g) determination of natural background values for environmental risk assessment, etc.

In Italy, the research Group lead by Prof. B. de Vivo, has accomplished a multidisciplinary Monitoring Project (Campania Transparent: 2015-2018) funded by Regional Government to map inorganics elements and Organic compounds (POP), in soils, underground waters, air, vegetation and biological samples, with the participation of geochemists, engineers, hydrogeologists, soil sciences experts, physicians, in order to get the state of the art of the environment related to health issues risks. De Vivo research group has

taken care of the soil and air matrices, producing Regional Geochemical Atlases (with about 1200 geochemical different type of maps) and tens of scientific publications on peer review journals.

NOVEMBER 2018

Current Status of Applied Geochemistry Research in Europe: Benedetto De Vivo, AAG Regional Councillor

The EuroGeoSurveys Geochemistry Expert Group (which has succeeded the WEGS and FOREGS Geochemistry Working Groups) is very active in continental-scale applied geochemical projects. Since the publication of the FOREGS Geochemical Atlas of Europe (http://weppi.gtk.fi/publ/foregsatlas/) the group has completed another two continental-scale projects. The first is concerned with European ground water geochemistry using bottled mineral water as the sampling medium (Reimann and Birke, 2010; Birke et al., 2010). This special issue includes 15 contributions from national teams in Croatia, Serbia, Slovenia (2), Hellas (2), Slovakia, Hungary, Italy (2), Fennoscandia, Germany (2), Portugal and Estonia. The second continental-scale project, completed in 2014, is concerned with the Geochemistry of European Agricultural and Grazing Land Soil (GEMAS – URL: http://gemas.geolba.ac.at/)and resulted in the publication of a two-volume atlas (Reimann et al., 2014a, b). The atlas on the geochemistry of agricultural and grazing land soil reports data for 68 determinands covering almost the entire European territory west of the Urals.

Apart from the completed continental-scale projects, the European Geochemistry Expert Group carries out urban geochemistry projects and published a textbook in 2011 (Johnson, C.C., Demetriades, A., Locutura, J. & Ottesen, R.T. (Editors), 2011. Mapping the Chemical Environment of Urban Areas. Wiley-Blackwell, Oxford, UK, 616 pp. http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0470747242,descCd-description.html), and case studies in a Special Issue of the Journal of Geochemical Exploration (Demetriades et al., 2015). In addition, the group has published two urban geochemistry manuals (Demetriades and Birke, 2015a, b).

At national and regional level have been published in Italy: (1) Geochemical Atlas of Italy from GEMAS Database, (2) Different Regional Atlas for Campania Region (the database has been used to publish different papers in peer review journals).

Benedetto De Vivo

Southern Europe Councillor of the AAG

Publications

Publications by EuroGeoSurveys Geochemistry Expert Group members on different aspects of European ground water geochemistry, the GEMAS project and others:

2013

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Demetriades, A., 2013. Quality of hellenic bottled mineral and tap water as a proxy for groundwater geochemistry. European Geologist (Special issue: Groundwater-the critical resource), 35, 7-15.
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Petrosino, P., Sadeghi, M., Albanese, S., Andersson, M., Lima, A. & De Vivo, B., 2013. REE contents in solid sample media and stream water from different geological contexts: Comparison between Italy and Sweden. Journal of Geochemical Exploration. Journal of Geochemical Exploration, 133, 176-201.

Sadeghi, M., A. Morris, G.A., Carranza, E.J.M., Ladenberger, A., Andersson, M., 2013. Rare earth element distribution and mineralization in Sweden: An application of principal component analysis to FOREGS soil geochemistry. Journal of Geochemical Exploration, 133, 160-175.

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Albanese S., Taiani M.V.E., De Vivo B. and Lima A., 2013. An environmental epidemiological study based on the stream sediments geochemistry of the Salerno Province (Campania Region, Southern Italy). J. Geochem. Explor. (Special Issue: Medical geology perspective on the risks associated with volcanism and brownfield. Belkin et al., eds), 131, 59-66

Albanese S., Iavazzo P., Adamo P., Lima A. and De Vivo B., 2013. Assessment of the environmental conditions of the Sarno river basin (south Italy): a stream sediment approach. Environmental Geochemistry and Health, 35 (3), 283-297. Doi: 10.1007/s10653-012-9483-x.

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Wang M., De Vivo B., Albanese S., Lima A., Lu W., Molisso F. and Sacchi M., 2013. Investigation on inorganic pollution level in surface sediments of Naples and Salerno bay. Computational Water, Energy, and Environmental Engineering (CWEEE), 2, 36-40. Doi: 10.4236/cweee.2013.22B006. Published Online April 2013 (http://www.scirp.org/journal/cweee).

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NOVEMBER 11, 2012

AAG Regional Councillor Report for Southern Europe: Benedetto De Vivo, AAG Regional Councillor

The EuroGeoSurveys Geochemistry Expert Group (which has succeeded the FOREGS Geochemistry Working Group) is very active in continental-scale applied geochemical

projects. Since, the publication of the FOREGS Geochemical Atlas of Europe (http://weppi.gtk.fi/publ/foregsatlas/) the group has completed two projects concerned with (a) , European ground water geochemistry using bottled mineral water as the sampling medium, and (b) the publication of a book on urban geochemistry. This work can be found in the following publications:

1) Reimann C. and Birke M., Eds + 79 others, 2010. Geochemistry of European Bottled Water. Borntraeger Science Publishers, Stuttgart. 268 pp. URL: http://www.schweizerbart.de/publications/detail/isbn/9783443010676/Geochemistry-of-European-Bottled-Water;

2) Birke M., Demetriades A. & De Vivo B. (Guest Editors), 2010. Mineral Waters of Europe. Special Issue, Journal of Geochemical Exploration, 107(3), 217-422. This r volume includes 15 contributions from national teams of Croatia, Serbia, Slovenia (2), Hellas (2), Slovakia, Hungary, Italy (2), Fennoscandia, Germany (2), Portugal and Estonia;

3) Johnson, C.C., Demetriades, A., Locutura, J. & Ottesen, R.T. (Editors), 2011. Mapping the Chemical Environment of Urban Areas. Wiley-Blackwell, Oxford, UK, 616 pp. Avalaible online at: http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0470747242,descCd-description.html),

In Europe, two large projects are presently being carried out (i) the Geochemistry of European Agricultural and Grazing Land Soil (GEMAS – URL:http://gemas.geolba.ac.at/) and (ii) Urban Geochemistry (URGE). The first will be completed in 2013, and the second in 2014.

Activities of the GEMAS and URGE Project Teams for 2013-14 include publication of (I) a European Atlas on the geochemistry of agricultural and grazing land soil, reporting data elaboration and geochemical maps for 68 determinands, covering almost the entire European territory until the Urals, and (II) case studies on urban geochemical mapping projects carried out in 10-12 European cities using a common sampling, sample preparation and analytical protocols.

Results of both GEMAS and URGE projects will be presented in a Session organised at the Goldschmidt Conference in 2013 in Florence. A selection of papers presented in this Session will be published in a Special Issue of Journal of Geochemical Exploration.

A significant contribution to European regional geochemistry in 2012 is the publication of the regional soil geochemical atlas of Spain (URL:http://www.igme.es/INTERNET/actividadesIGME/lineas/CartoGeo/geoquimica/geoquimicaIng.htm). About 40,000 soil samples were collected and analysed for 63 elements.

Another significant contribution to European urban geochemistry in 2012 is the completion of the surface soil geochemical project in Dublin in Ireland (URL: http://www.gsi.ie/surge).

Publications by EuroGeoSurveys Geochemistry Expert Group members on different aspects of European ground water geochemistry, and the GEMAS project:

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Benedetto De Vivo, AAG Regional Councillor for Southern Europe

The EuroGeoSurveys Geochemistry Expert Group, which has succeeded the FOREGS Geochemistry Group, is presently carrying out two large projects, the Geochemistry of European Agricultural and Grazing Land Soil (GEMAS) and Urban Geochemistry (URGE) that will keep the group busy for the next 3-year period, and has just completed a project on European groundwater geochemistry using bottled water. The results of this project have been published in an Atlas (Reimann C and Birke, Eds + 79 others, 2010. Geochemistry of European Bottled Water. Borntraeger Science Publishers. Stuttgart. ISBN 978-3-443-01067-6, 268 pp. URL: http://www.schweizerbart.de/publications/detail/isbn/9783443010676/Geochemistry-of-European-Bottled-Water), and country interpretations are in the processed of being published in a Special Issue of the Journal of Geochemical Exploration (Mineral waters of

Europe, Birke M., Demetrides A. and De Vivo B., Eds). The latter volume will include 15 contributions from national teams of Croatia, Serbia, Slovenia (2), Greece (2), Slovakia, Hungary, Italy (2), Fennoscandia, Germany (2), Portugal and Estonia.

At present the Group is setting up its own website that will introduce the projects and activities to the broader public.

Other activities of the EuroGeoSurveys Geochemistry Expert Group for the period 2010-2013, include (a) publication of a book on urban geochemistry studies in early 2011 (Johnson et al., Mapping the Chemical Environment of Urban Areas – Wiley), (b) data elaboration and publication of GEMAS project results, and (c) publication of new results of the Geochemical Atlas of Europe project. It is noted, because of industry restrictions, the GEMAS Atlas will be published in 2013.

The URGE project is carried out by a sub-group of the Geochemistry Expert Group led by Rolf Tore Ottesen of NGU. The aim of the URGE project is to carry out urban geochemical mapping of 10-12 European cities using a common sampling and analytical protocol, so that results are directly comparable across the continent. We expect that sampling can be carried out during 2011 and all analytical results are in available in 2012, which would result in “final reporting” around the end of 2012 or beginning of 2013.