Applied Geochemistry 24 (2009) 189–190

Contents lists available at ScienceDirect

Applied Geochemistry

journal homepage: www.elsevier.com/locate/apgeochem

Preface

Natural Low-pH Environments Unaffected by Human Activity

Acidic, metalliferous environments are commonly found in areas disturbed by active or abandoned metal and coal mining, largely as a function of local geology and deposit type. However, there are numerous additional geologic environments where acid naturally occurs. Some of these environments include certain active volcanoes, pyritic black shale terrains, submarine and terrestrial hot spring systems, undisturbed mineral deposits, and saline lacustrine or groundwater systems. High metal concentrations may be, but are not always, present in these natural low-pH environments.

As a means to document diverse naturally acidic environments for the environmental community, a special session entitled "Geochemistry of Natural Low-pH Environments Unaffected by Human Activity" was held at the 7th International Symposium on Environmental Geochemistry in Beijing, China in September, 2006. Twelve talks and posters were presented on volcanic systems (Varekamp, 2006; Schaefer et al., 2006; Tassi et al., 2006), hot springs systems (Nordstrom, 2006), pyritic black shales (Kwong, 2006), porphyry systems (Verplanck et al., 2006; Plumlee et al., 2006), unmined volcanogenic massive sulfide systems (Eppinger et al., 2006, 2007), Australian acid-saline groundwaters (Dickson and Giblin, 2006; Raghimi, 2006), Chinese acid groundwaters (Zhou et al., 2006), and acid forest soils in China (Xu et al., 2006). Keynote talks were given by Johan Varekamp and Kirk Nordstrom. Following this session, a call was made for these presenters and other scientists to contribute to a collection of papers to be published together in *Applied Geochemistry*. This collection of papers is the result of the special session and subsequent call for contributions.

Twelve papers were submitted, several by scientists who did not attend the special session, and nine were accepted for inclusion in this group. The nine papers on natural low-pH environments cover diverse topics. These include papers on acid-sulfate waters in hydrothermal systems in Yellowstone National Park, USA (Nordstrom et al.); natural acid waters at Copahue volcano in Argentina (Varekamp et al.); natural acid rock drainage associated with black shales in the Yukon Territory, Canada (Kwong et al.); the undisturbed Drenchwater shale-hosted Zn–Pb–Ag deposit in Alaska, USA (Graham and Kelley); low-pH waters discharging from submarine vents at Panarea Island, Italy (Tassi et al.); natural acidic surface and ground waters draining porphyry deposits in the southern Rocky Mountains of Colorado and New Mexico, USA (Verplanck et al.); acid-saline lakes in southern Western Australia (Bowen and Benison); and acid-saline groundwater and lakes in southern Australia (Long et al., and Dickson and Giblin).

These papers present new data, research, interpretations, and summaries to better understand and document the occurrence of diverse natural low-pH environments on the Earth's surface. An understanding of the concept of natural acidity in the environment is important for researchers of environmental habitats, and particularly for those involved in the clean-up and mitigation of human-induced acidic and metalliferous areas.

The efforts of the authors are greatly appreciated. All contributions were subject to regular peer review following the guidelines established by *Applied Geochemistry*. We thank all of the reviewers for their comments and constructive criticism, which greatly improved the quality of these papers.

References

Dickson, B., Giblin, A., 2006. Features and effects of some acid-saline groundwaters of southern Australia. Chinese J. Geochem. 25 (Suppl. 1), 227.

Eppinger, R.G., Briggs, P.H., Dusel-Bacon, C., Giles, S.A., Gough, L.P., Hammarstrom, J.M., Hubbard, B.E., 2006. Naturally acidic and metalliferous waters at unmined volcanogenic massive sulfide deposits in the Bonnifield mining district, Alaska Range, east-central Alaska. Chinese J. Geochem. 25 (Suppl. 1), 232.

Eppinger, R.G., Briggs, P.H., Dusel-Bacon, C., Giles, S., Gough, L.P., Hammarstrom, J.M., Hubbard, B.E., 2007. Environmental geochemistry at Red Mountain, an unmined volcanogenic massive sulphide deposit in the Bonnifield district, Alaska Range, east-central Alaska. Geochem. Explor. Environ. Anal. 7, 207–223.

Kwong, J.Y.T., 2006. Attenuation of aqueous metal transport at two natural acid rock drainage occurrences in the Yukon Territory, Canada. Chinese J. Geochem. 25 (Suppl. 1), 229–230.

Nordstrom, D.K., 2006. Yellowstone's acid waters: a plethora of chemical and biological activity. Chinese J. Geochem. 25 (Suppl. 1), 232–233.

Plumlee, G.S., Vincent, K.R., Ludington, S., Verplanck, P.L., Nordstrom, D.K., 2006. Rapid natural acid weathering, physical erosion, and debris-flow hazards in scar areas developed on hydrothermally-altered rocks along the Red River Valley near Questa, New Mexico, USA. Chinese J. Geochem. 25 (Suppl. 1), 231–232.

Raghimi, M., 2006. Surface mineralogy of degraded agricultural lands affected by natural acid-saline seeps, southwestern Australia. Chinese J. Geochem. 25 (Suppl. 1), 227.

Schaefer, J.R., Evans, W.C., Wang, B., Scott, W.E., McGimsey, R.G., Jorgenson, J., 2006. Catastrophic and persistent environmental consequences of an acid crater-lake discharge, Chiginagak Volcano, Alaska. Chinese J. Geochem. 25 (Suppl. 1), 230.

Tassi, F., Vaselli, O., Fernandez, E., Duarte, E., Montegrossi, G., Minissale, A., 2006. The effects of microbial activity on the geochemistry of highly acidic crater lakes: an example from Laguna Caliente, Poas volcano (Costa Rica). Chinese J. Geochem. 25 (Suppl. 1), 228–229.

Varekamp, J.C., 2006. The acid lakes and rivers of Copahue Volcano, Argentina. Chinese J. Geochem. 25 (Suppl. 1), 229.

Verplanck, P.L., Nordstrom, D.K., Plumlee, G.S., Wanty, R.B., Bove, D.J., Caine, J.S., 2006. Hydrogeochemical controls on surface and groundwater chemistry in naturally acidic, porphyry-related mineralized areas, southern Rocky Mountains. Chinese J. Geochem. 25 (Suppl. 1), 231.

Xu, Xingkai, Wei, Jin, Xu, Honghui, Yuan, Bin, Wang, Yuesi, 2006. Distribution of soluble heavy metal concentrations in natural acid soils at depths under tropical, sub-tropical and temperate forests of China. Chinese J. Geochem. 25 (Suppl. 1), 228.

Zhou, Xun, Li, Rui, Zhang, Hua, Zhang, Li, 2006. Characteristics of natural low pH groundwater in the coastal aquifers near Beihai, China. Chinese J. Geochem. 25 (Suppl. 1), 228.

0883-2927/$ - see front matter Published by Elsevier Ltd.
doi:10.1016/j.apgeochem.2008.11.020

Robert G. Eppinger
US Geological Survey
P.O. Box 25046
MS 973, Denver
CO 80225, USA
E-mail address: eppinger@usgs.gov

Ron Fuge
Institute of Geography and Earth Sciences
Aberystwyth University, Aberystwyth
Ceredigion SY23 3DB, UK
E-mail address: rrf@aber.ac.uk

Available online 24 November 2008