

1.1 Mineral exploration using groundwater geochemistry

One day course and workshop

Date: 17th September 2005 (Saturday before the IGES)

Place: Perth Sheraton

Course Presenters: *Patrice de Caritat, David Gray, Michelle Carey and 'Bear' McPhail*

Course Registration A\$253

This short course will have only the necessary formal theoretical lectures and will focus on a number of mineral exploration case studies. With each case study, relevant theory will be reviewed and applied to solve real exploration issues. The presenters will draw from their work experience and may call on invited guests to present other studies.

Contents

- Introduction: Review of fundamental principles
- Methods: How to collect groundwater
- Au exploration in the Yilgarn and Gawler cratons: pH, redox, salinity
- Au exploration at St Ives: Hydrogeology, salinity
- Pb-Zn exploration in the Curnamona Province: Oxidation, isotopes, adsorption
- Ni exploration at Harmony: Oxidation, water-rock interaction
- Others as time permits



Presenters:

Dr Patrice de Caritat (Lic. Sci., Ph.D.) (Course leader)

CRC LEME and Geoscience Australia (GA), Canberra, Australia

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Email: patrice.decaritat@ga.gov.au



Patrice trained in geology, mineralogy and geochemistry. His research interests include exploration and environmental geochemistry, hydrogeochemistry and isotope geochemistry. Before joining GA in 1997 to lead the Basins Program for CRC LEME, he was a Senior Research Scientist with the Geological Survey of Norway. Prior to that he was a Post-Doctoral Fellow in the Department of Geology and Geophysics of the University of Calgary (Canada), and in the Department of Geology and the Research School of Earth Sciences of the ANU in Canberra. He is actively involved in geochemical and hydrogeochemical research related to mineral exploration, environmental and regolith processes, as well as in teaching.

Dr David Gray (BSc Hons, Ph.D.)

CRC LEME and CSIRO Exploration and Mining,

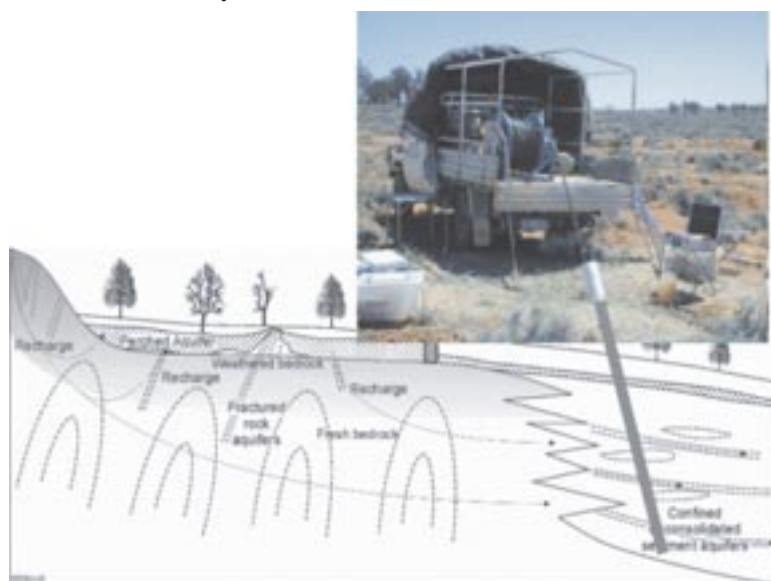
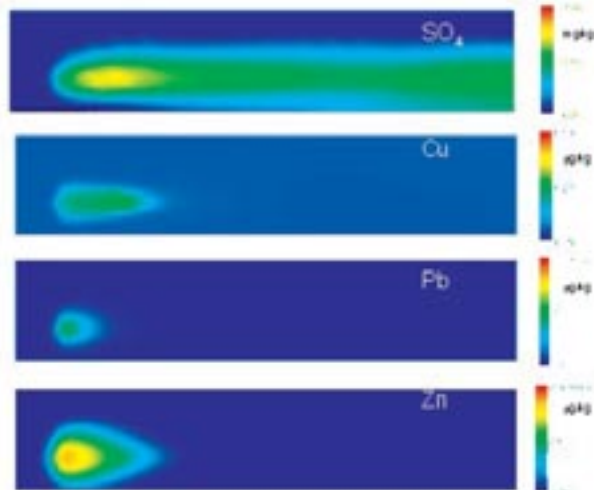
Perth, Australia

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Since joining CSIRO in 1988, David has investigated the geochemistry of groundwaters in Western Australia, and the role of salinity, acidity and oxidation in controlling groundwater and regolith geochemical anomalies. He has also investigated the interactions of precious metals with soils, regolith and humic substances, and developed and applied selective extraction methods to soil geochemistry in deeply weathered terrains. David's expertise particularly lies in the geology and geochemistry of secondary mineral deposits, and supergene redistribution of gold and platinum group elements. He has led various research projects, including AMIRA P504 'Supergene gold in the Yilgarn Craton', 1997-2001. In 1997 he received the Science & Technology Award, Association of Mining and Exploration Companies.

Dr D.C. 'Bear' McPhail (B.Sc. (Hons), M.Sc., Ph.D.)
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'Bear' is an aqueous/hydrothermal geochemist with extensive research expertise in surface and ground water quality, water-rock interaction, hydrothermal ore formation and experimental geochemistry. Currently, he is a Key Researcher and Executive with CRC LEME and a Reader in geochemistry at the ANU. His current research interests include geochemistry and mobility of metals (Au, Cu and Zn) and salts in regolith and groundwater. This includes the impact of microbes on Au mobility, sorption of Cu and Zn on Fe oxyhydroxides, the chemistry of Au in brines and the use of hydrogeochemistry in mineral exploration. He has consulted with industry and government on mineral exploration and environmental contamination and has developed undergraduate, graduate and industry short courses and degrees at Monash University and the ANU.



Michelle Carey (PhD)
 WMC Resources Ltd, Belmont, Western Australia
 Email: Michelle.Carey@wmc.com.au

Michelle has been involved in exploration geochemistry, in particular for nickel and gold, for the last ten years, working for most of that time for WMC Resources. Her specific areas of expertise include hydrogeology of saline groundwater systems, development of hydrogeological and geochemical mathematical models and the mobility of gold, nickel and PGEs in soil and groundwater. Michelle is currently involved in applying hydrogeochemistry to nickel exploration both in Australia and overseas.

