



Australian  
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# RSES Seminar

**Thursday, September 29<sup>th</sup> 2011, 3 PM**

**Dr. Vincent Post**

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## **Changes in groundwater quality due to climate change**

Abstract:

Considerable concern has been voiced over the potential negative impacts on the quality and availability of water resources under future scenarios of climate warming. It is challenging, however, to predict how exactly the chemical composition of groundwater will be affected by changes in climate due to a myriad of factors and feedbacks that control groundwater chemistry. In this study, a reactive transport model was used to quantify the potential effect of a shift in the distribution of groundwater recharge over the year on the chemical composition of baseflow of a stream draining a hillslope. The recharge conditions that were evaluated ranged from an even distribution throughout the year to all recharge occurring during the summer or winter. The only factor that was considered to control the differences in recharge composition was the seasonal regime of the CO<sub>2</sub> pressure in the soil zone. Partial pressures of CO<sub>2</sub> in the soil zone were varied from 0.001 atm in the winter to 0.021 atm in the summer and recharge water was assumed to be in equilibrium with the soil atmosphere. Model outcomes were generalized by considering different lithologies and chemical conditions. In all cases, a decrease of yearly-averaged values of total inorganic carbon and an increase of pH in the stream occur if the proportion of winter recharge increases. Simultaneously, the yearly-averaged concentrations of the base cations like Ca and Si decrease up to 20% for anticipated shifts in the seasonal recharge distribution.

Dr. Post's main research interests are in the hydrogeology of coastal areas and the development of models to simulate the movement of solutes and geochemical reactions in the subsurface. A particular aspect of his research is on hydrological processes that operate on large, geological timescales. Approaching groundwater problems from that perspective often yield new and surprising insights that contrast with those from researchers that take an 'engineering' approach. His research interests include:

- fresh and saline groundwater interactions, e.g., seawater intrusion;
- groundwater/surface water interaction, e.g., submarine groundwater discharge;
- variable density groundwater flow phenomena;
- reactive transport modelling and code development;
- flow tank and column experimentation of transport processes;
- isotope hydrology and groundwater dating;
- geophysical methods; and
- Quaternary geology.

His research activities involve field investigations, computer simulations (modelling), laboratory work and code development.

The RSES Seminar will be in the Jaeger Seminar Room, 1<sup>st</sup> Floor Jaeger Building, RSES, ANU. Following the Seminar, drinks and nibbles will be available in the RSES Foyer