



15th Water-Rock Interaction International Symposium, WRI-15

Groundwater recharge quantification from historical rainfall records and salinity profiling in the RAMSAR listed Verlorenvlei catchment, South Africa

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Abstract

The Verlorenvlei RAMSAR listed wetlands in the Sandveld of South Africa are threatened by the effects of salinization coupled with low rainfall. The lack of surface water throughout most of the year suggests that the wetlands may be fed by deeper groundwater sources. The Verlorenvlei River feeds into the wetlands and has four major tributaries which will form the basis of this study. A number of recharge techniques have been implemented in the Sandveld, but little research has characterised the groundwater of the tributaries of the Verlorenvlei River and their contribution to the wetlands. The Chloride Mass Balance technique and stable isotopes will be used to estimate the recharge occurring in these sub-catchments, with tritium and radiocarbon providing time constraints. These results can be compared to longer-term rainfall records to predict future fluctuations in groundwater availability. Eight rainfall collection points have been established throughout the catchment, with corresponding deep boreholes to be sampled on a regular basis. Preliminary results show that the shallow groundwater is more saline than the corresponding deep sources, with the exception of the fresh Krom Antonies tributary which is thought to be the main input source for the Verlorenvlei River.

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Peer-review under responsibility of the organizing committee of WRI-15

Keywords: CMB; Isotope Geochemistry; Recharge; Sandveld; Verlorenvlei

1. Introduction

The West Coast of South Africa is defined by low annual rainfall and semi-arid to arid conditions. Groundwater provides a primary source of irrigation and potable water, and is thus an essential part of life in this agriculturally dominated area. Located 50 km inland along the West Coast are the Verlorenvlei RAMSAR listed wetlands, which

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