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- Special Issues
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- Title and Author Search

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Defining the climatic signal in stream salinity trends using the Interdecadal Pacific Oscillation and its rate of change

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Abstract. The impact of landuse on stream salinity is currently difficult to separate from the effect of climate, as the decadal scale climatic cycles in groundwater and stream hydrology have similar wavelengths to the landuse pattern. These hydrological cycles determine the stream salinity through accumulation or release of salt in the landscape. Widespread patterns apparent in stream salinity are discussed, and a link is demonstrated between stream salinity, groundwater levels and global climatic indicators. The Interdecadal Pacific Oscillation (IPO) has previously been investigated as a contributory climatic indicator for hydrological and related time series in the Southern Hemisphere. This study presents an approach which explores the rate of change in the IPO, in addition to its value, to define an indicator for the climate component of ambient shallow groundwater levels and corresponding stream salinity. Composite time series of groundwater level and stream salinity are compiled using an extensive but irregular database covering a wide geographical area. These are modelled with respect to the IPO and its rate of change to derive control time series. An example is given of how a stream salinity trend changes when the decadal climatic influence is removed.

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