

# Hervey Bay: A Salt Fountain in Subtropical East Australia

Joachim Ribbe

Computational Engineering and Science Research Centre, Department of Biological & Physical Sciences, University of Southern Queensland, Toowoomba 4350 Australia.

Email: [Joachim.Ribbe@usq.edu.au](mailto:Joachim.Ribbe@usq.edu.au)

## Abstract

Australia's climate is one of the driest in the world with high year-to-year rainfall variability and many estuaries in the region are characterised by an inverse circulation. This flow is driven by high evaporation, low river runoff and the production of high salinity water in shallow coastal regions. Dense water moves as a gravity current along the seafloor toward the open ocean. To compensate for the outflow of high salinity water, oceanic water of lower salinity is entering the region at the surface. The Mediterranean Sea, the Gulf of California, the Persian Gulf, and Spencer Gulf in South Australia are examples of large ocean basins and coastal embayment which are characterised by inverse circulations. Similar conditions were found for Hervey Bay during a hydrographic survey conducted in early spring 2004. I discuss the observed salinity distribution and introduce a simple model that informs about water residence time scales. Analysis of the historical rainfall and river runoff data supports the hypothesis that the inverse circulation is a climatological feature of this estuary which is not limited to the dry season of the year. It is likely that due to declining rainfall in coastal northeast Australia, these conditions are to persist into the near future and need to be considered for coastal management.

## Biography

Dr. Joachim Ribbe is a Physical Oceanographer by training and applies in his research general circulation models of the ocean and atmosphere. He analyses data from climate and ocean models in order to investigate the general circulation of the ocean, to improve our knowledge of the ocean's role in driving climate variability, and to study the impact of climate variability upon the coastal ocean. His research projects focus upon climate processes in several geographic regions where important climate mechanisms operate and strong exchanges between the ocean and atmosphere are at play. These include the equatorial Pacific Ocean, the Southern Ocean, the Southeast Pacific Ocean, and the continental shelf seas around Australia.