Geophysical Research Abstracts
Vol. 16, EGU2014-5864, 2014
EGU General Assembly 2014

An algorithm based on sea level pressure fluctuations to identify major Baltic inflow events

Semjon Schimanke, Christian Dieterich, and H.E. Markus Meier
SMHI, FoUo, Norrköping, Sweden (semjon.schimanke@smhi.se)

The Baltic Sea is one of world largest brackish water areas with an estuarine like circulation. It is connected to the world ocean through the narrow Danish straits limiting the exchange of water masses. The deep water of the Baltic Sea is mainly renewed by so called major Baltic inflows which are an important feature to sustain the sensitive steady state of the Baltic Sea. We introduce an algorithm to identify atmospheric variability favourable for major Baltic inflows. The algorithm is based on sea level pressure fields as the only parameter. Characteristic sea level pressure pattern fluctuations include a precursory phase of 30 days and 10 days of inflow period. The algorithm identifies successfully the majority of observed major Baltic inflows between 1961–2010. In addition, the algorithm finds some occurrences which cannot be related to observed inflows. In these cases with favourable atmospheric conditions inflows were precluded by contemporaneously existing saline water masses or strong freshwater supply. No event is registered during the stagnation period 1983-1993 indicating that the lack of inflows is a consequence of missing favourable atmospheric variability. The only striking inflow which is not identified by the algorithm is the event in January 2003. We demonstrate that this is due to the special evolution of sea level pressure fields which are not comparable with any other event. Finally, the algorithm is applied to an ensemble of scenario simulations. The result indicates that the number of atmospheric events favourable for major Baltic inflows increases slightly in all scenarios. Possible explanations as for instance more frequent atmospheric blockings or changes in the NAO will be discussed.