



Mixing and dynamics of a gravity plume - observations, theory, and modeling

L. Arneborg (1), **V. Fiekas** (2), and **H. Burchard** (3)

(1) Earth Sciences Center, Göteborg University, Box 460, SE-40530 Göteborg, Sweden (laar@oce.gu.se), (2) Forschungsanstalt der Bundeswehr für Wasserschall und Geophysik, Klausdorfer Weg 2-24, D-24148 Kiel, Germany (heinzvolkerfiekas@bwb.org), (3) Baltic Sea Research Institute Warnemünde, Seestr. 15, D-18119 Rostock-Warnemünde, Germany (hans.burchard@io-warnemuende.de)

During a medium-intensity inflow through the Sound in February 2004, detailed oceanographic measurements were performed along and across the salinity plume descending north of Krieger's Shoal into the main Arkona Basin. Several CTD and ADCP cross-sections were obtained, and intensive measurements of dissipation rates of turbulent kinetic energy were performed during a 21h period. The plume leans against Krieger's Shoal in geostrophic balance. The gravity component in the flow direction is mainly balanced by bottom friction. A secondary circulation cell caused by Ekman veering is observed directly in the ADCP data, but also indirectly in the CTD cross-sections, which show a transverse density gradient with density increasing towards the north (towards left, seen in the flow direction). These observations are interpreted in terms of momentum balance, entrainment processes, and importance of the secondary circulation, with the help of theoretical considerations and conceptual 1D, 2D and 3D turbulence modeling studies. Finally, the results are placed in a broader perspective including plumes in other parts of the world. This work has been performed in the framework of the QuantAS Consortium.