



## The rate of inflow and mixing during deep-water renewal in a sill fjord

Arneborg, Lars, Carina P. Erlandsson, Bengt Liljebladh, Anders Stigebrandt

Limnol. Oceanogr., 49(3), 2004, 768-777 | DOI: 10.4319/lo.2004.49.3.0768

**ABSTRACT:** We obtained high-resolution data on a deep-water renewal in the basin of Gullmar Fjord, Sweden, using an autonomous profiling platform. In the middle of the fjord, where the platform is anchored, renewal starts with the passage of a gravity current front and continues with a steady thickening of the new, oxygen-rich, low-nitrate bottom layer and an associated lifting of the old, oxygen-depleted, high-nitrate bottom water. The basin continuously fills to sill level during a period of 10 d. At the mouth of the fjord, a three-layer structure develops. Renewal is driven by the density difference between the intermediate water inside and the new deep water outside the fjord. The volume flux is well predicted by a hydraulic exchange model in which the upper layer plays a passive role. Local upwelling and downwelling of the upper halocline cause fluctuating baroclinic currents during renewal, but these seem to have little influence on the average volume flux of new deep water. Entrainment rates are small, and the associated volume flux increase seems to be balanced by detrainment.

### Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

### Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.