Geophysical Research Abstracts
Vol. 15, EGU2013-8372, 2013
EGU General Assembly 2013

Semidiel vertical migrations of plankton in a fjord

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Time series of acoustic backscatter and vertical velocity profiles were obtained at three sites along a Chilean fjord with the purpose of determining dominant structures of vertical migrations of the sound scattering layer. Ancillary data obtained with stratified net samples indicated that the sound scattering layer was dominated by euphausiids. Therefore, distributions of acoustic backscatter anomalies and vertical velocities were attributed to vertical migrations of predominantly these organisms. Migration patterns were dominated by twilight excursions in which organisms swam toward the water surface at dusk, spent <0.5 h at a depth near the pycnocline and then swam downward to depths between ∼30 and ∼50 m. After congregating at those depths during night-time, organisms swam upward again toward the pycnocline at dawn , spent <1 hr near the pycnocline and swam downward to their day-time depths (>100 m). This revealing migration strategy can also be termed ‘semidiel migration’ as there are two excursions linked to light levels. The reasons for this semidiel migration are uncertain, but it is possible that the up and down motion at dusk is related to predation avoidance, hunger–satiation state, ontogeny or reaction to the environmental shock of the pycnocline, or a combination of all or some of them. In contrast, the dawn double excursion is probably linked to feeding needs by organisms that need to spend the day at great depth with no food available. Although these patterns have previously been described, this study demonstrated their existence throughout the fjord and through prolonged periods. In addition, identification of this pattern by acoustic backscatter is complemented by direct vertical velocity measurements. It is proposed that semidiel vertical migration is a dominant strategy in fjords and should be adjusted to the typical paradigm.