Variability of zooplankton abundance in Saanich Inlet, B.C.

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Abstract
Variability of zooplankton abundance in Saanich Inlet, British Columbia, is quantified using 200 kHz echosounder data collected through the VENUS cabled observatory. The continuous and high-resolution nature of our observations enables monitoring of zooplankton abundance in daily, seasonal and annual scales. By detecting seasonal changes in migration timing, area backscattering strength (Sv) of nocturnal backscattering layers is estimated. This study highlights the importance of high sampling resolution and long records for characterizing the variability and complexity in zooplankton populations.

I. Introduction
Diel vertical migration (DVM) is a predator-avoidance strategy: organisms ascend to the surface waters at dusk, feed in the surface waters at night, and descend again at dawn to avoid visual predators.

DVM timing relative to sunset/sunrise changes seasonally: early dusk ascent and late dawn descent occur during spring-fall, while late dusk ascent and early dawn descent occur during winter (Sato et al. 2013).

Changes in migrating biomass can affect efficiency of biological pump. Estimates of carbon transport by DVM of zooplankton range from 4-34% of the gravitational flux of organic particles (Hernandez-Leon et al. 2010).

Research Objective
To quantify seasonal, inter- and intra-annual variability of zooplankton abundance in Saanich Inlet.

II. Methods

Site of VENUS cabled observatory in Saanich Inlet, B.C.

- Instruments
  - 200-kHz echosounder (ASL Env. Sci.) at 100 m
  - CTD at 100 m
  - Fluorometer at 8 m

- Groundtruthing: zooplankton community was sampled during sunset/sunrise in Apr, Jun, Jul 2010, Oct, Dec 2011, and Feb 2012 using a 1 m² Tucker trawl (1 mm mesh).

III. Observations

3-D data cube can be used as biomass index for zooplankton monitoring through cabled observatory.

IV. Conclusions

- Continuous DVM throughout the winter during Nov 2008 - Mar 2009 is the only exception to the low backscattering in winter.
- DVM in most winters is weak throughout the water column.

References

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