ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

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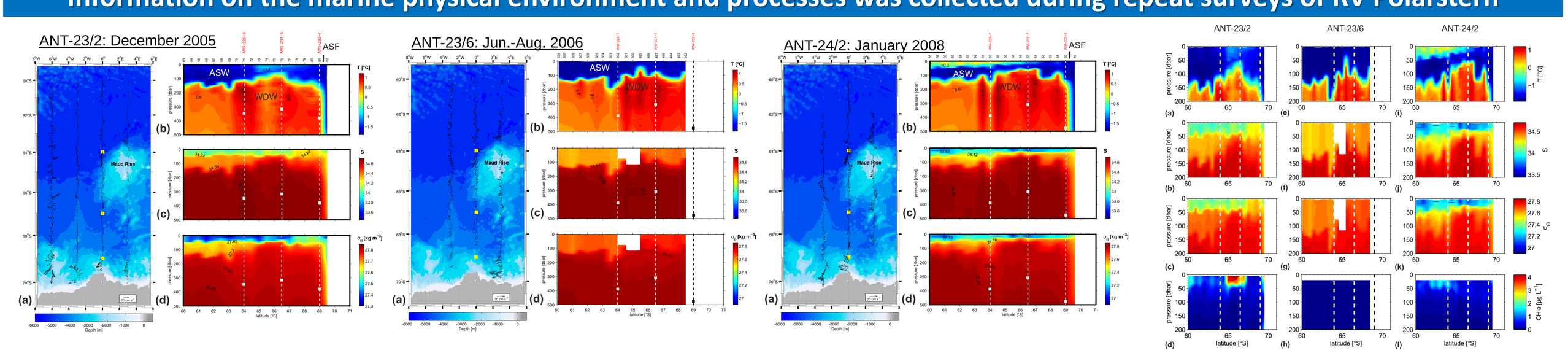
THÜNEN

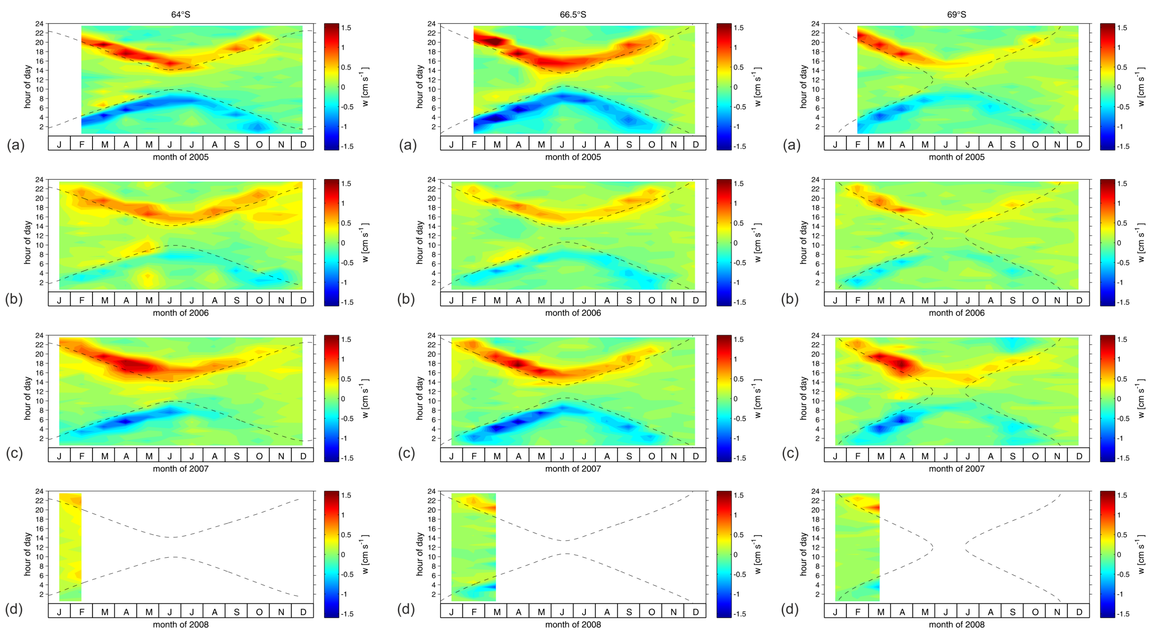
Meridional and interannual variations of the seasonally modulated zooplankton diel vertical migration in the Lazarev Sea and their possible physical-biological controls

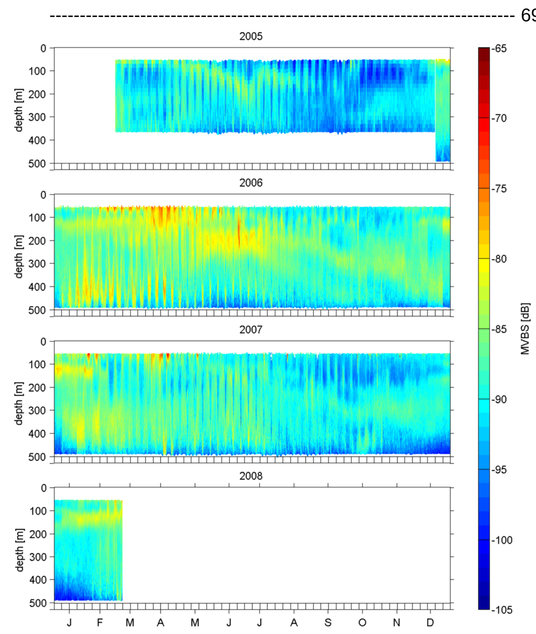
Motivation: ***Understanding the natural variations which occur contemporarily on inter-annual and shorter time scales is needed as prerequisite for success of any endeavours to project the effects of future climate change on ecosystems.***

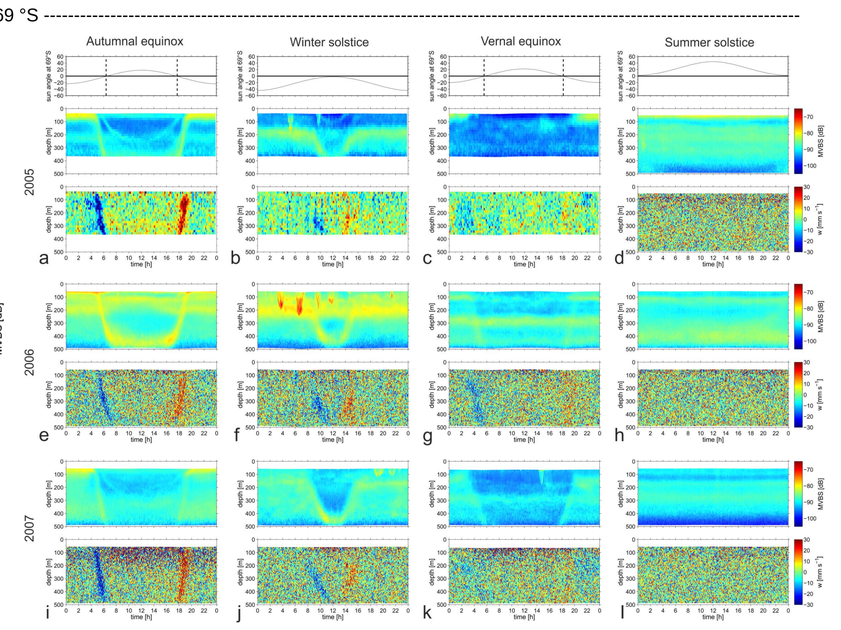
Information on the marine physical environment and processes was collected during repeat surveys of RV Polarstern



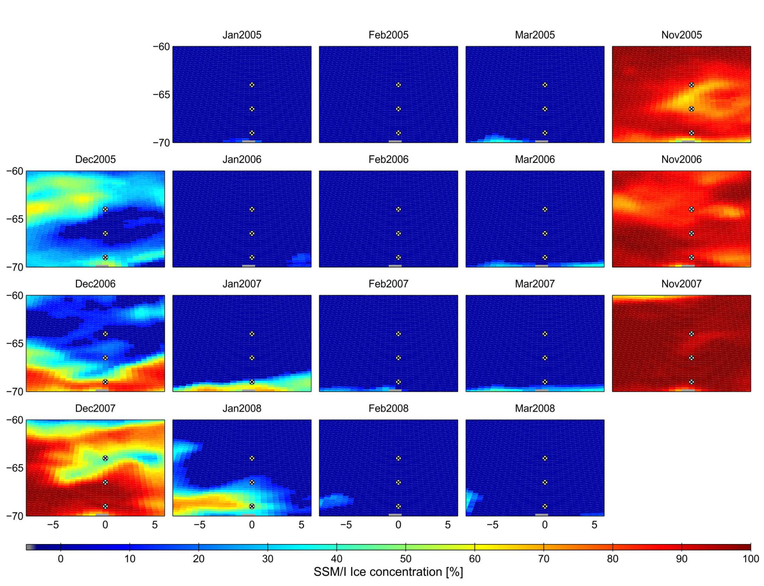
Multi-year time series recorded by moored acoustic Doppler current profilers (ADCPs) revealed the vertical migration speed of zooplankton/nekton (w) as well as the biomass-related variations of the mean volume backscattering strength (MVBS).

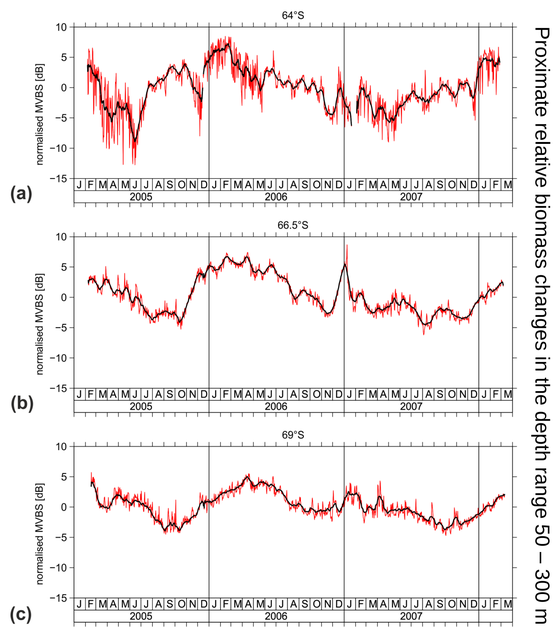


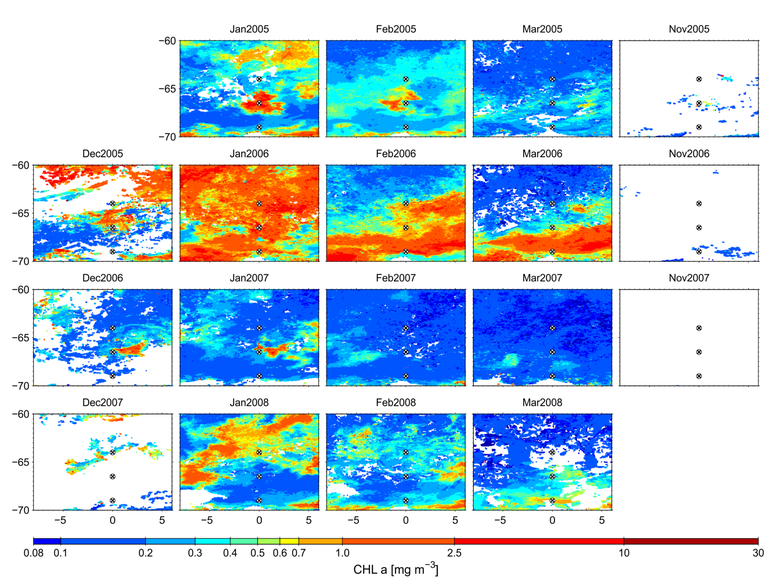




Regional distributions of sea ice and near-surface chlorophyll obtained from satellite remote sensing allowed investigation of the non-local effects on zooplankton variability at the mooring sites during the deployment period.







Summary of results and conclusions:

- **The daily vertical migration (DVM) of zooplankton is closely coupled to the astronomical daylight cycles. While the DVM is symmetric around local noon, the annual modulation of the DVM is clearly asymmetric around winter/summer solstice.**
- **On the average annual cycle, zooplankton abundance in the water column is highest end of summer and lowest mid to end winter.**
- **Water column mean zooplankton abundance varies several-fold between years and between locations.**
- **Inter-annual and spatial variations of zooplankton mean abundance seem to follow the magnitude of the phytoplankton spring bloom.**
- **Mixed-layer shallowing during vernal ice melt appears to be a necessary condition for the development of the phytoplankton spring bloom but not the major control factor of its magnitude.**
- **One possible explanation for nonappearance of a phytoplankton spring bloom is grazing by zooplankton grown during the previous summer.**

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