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Does an acoustic deep scattering layer show dial vertical migration in the Arctic?

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Acoustic observations on multiple frequencies by hull mounted and vertical profiling equipment during a survey to the west and north of Svalbard during autumn 2015, revealed that a deep scattering layer (DSL) was found at depths 300-500m in areas with bottom depths exceeding 600m. During periods of station work, when the ship was more or less stationary or moving slowly, a clear, but limited ascending movement during nighttime and a descending movement during daytime of this DSL was revealed. The high-light mass mean depth (MMD) with respect to backscattered energy was statistically deeper than the low-light mass mean depth for all the studied periods. This behavior of the DSL was found to be consistent both when the sun was continuously above the horizon and after it started to set on 1 September. The biological composition of the DSL was studied by vertical and oblique hauls with zooplankton nets and pelagic trawls, some of them with an opening/closing mechanism, and by vertical casts with an acoustic probe carrying side-looking multi-frequency echosounders operating at four frequencies, and a stereo camera system. A preliminary analysis of these data suggests that the DSL mainly consisted of various mesopelagic fishes, large zooplankton like krill, amphipods, and various gelatinous forms.

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