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Matched 2D velocity models of the sedimentary cover and the acoustic basement of the Arctic Ocean based on wide-angle reflection/refraction seismic sonobuoy soundings and MCS data

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For the Russian LCS project, regional seismic data - 2D MCS (multichannel seismic) and wide-angle reflection/refraction seismic sonobuoy soundings were obtained in the Arctic Ocean in 2011, 2012 and 2014 years.
For correct time/depth conversion of seismic sections obtained with a short streamer (600m) in difficult ice conditions wide-angle reflection/refraction seismic sonobuoy soundings were used.
The registration of seismic information was carried out by the BOX radio telemetric system manufactured by Fairfield Industries. The BOX radio telemetric system consist of single drifting modules with a radio channel on which a hydrophone submerged into water was fixed (sonobuoy). An inverse flank observation system with common reception point was used during the sounding.
Matched 2D velocity model compilation consists of the following steps:
Step 1. MCS data processing obtained by short (600 m) streamer.
Step 2. Processing of wide-angle refraction/reflection data collected by sonobuoys. Calculation of vertical velocity spectrums by means in ProMAX software.
Step 3. Time-Depth conversion with RMS velocity of wide-angle reflection sonobuoy data. Tracing major unconformities in sedimentary cover and top of acoustic basement.
Step 4. Loading of major interpreted boundaries in the Seiswide. Formation of initial depth velocity Seiswide model. Ray-tracing modelling of wide-angle refraction/reflection sonobuoy data.
Step 5. Interpretation of reflection and refraction P-waves on sonobuoy records in accordance with interpretation of MCS data. Matching of interval velocities on vertical velocity spectrums with interval velocities from Seiswide model. Estimation of interval velocity dispersion. Seiswide velocity model correction.
Step 6. Converting of final depth Seiswide velocity model into velocity (interval velocity in time) SEG-Y. Recalculation of the depth section with new velocity models.
Velocity models of the sedimentary cover and the acoustic basement of the Arctic Ocean based on wide-angle reflection/refraction seismic sonobuoy soundings allowed to update the map of the sedimentary cover thickness of the Arctic Ocean.