

## **Antarctic ice-sheet behavior in the Ross Sea outer continental margin in the late Miocene to early Pliocene from preliminary results of regional seismic stratigraphy and IODP Site U1522**

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Reconstruction of paleobathymetry and seismic stratigraphic mapping in the Ross Sea outer continental margin allows us to understand past Antarctic ice-sheet behavior and associated sedimentary processes. Two major glacial unconformities, namely, the Ross Sea Unconformity 3 (RSU3) and RSU2, were recognized and mapped in the Ross Sea continental shelf by the Antarctic Offshore Stratigraphy (ANTOSTRAT) project in 1995. These unconformities represent major changes in the architecture of the continental margin, although the lack of seismic and drill site data from some of the sectors in the continental shelf and slope prevented to fully understand time and mechanism of their formation so far. Here we present the preliminary results of the paleobathymetric reconstruction at the time of RSU3 and RSU2 (late Miocene to early Pliocene) formation, based on the core-log-seismic correlation of IODP Exp. 374 Site U1522 and adjacent seismic profiles in the eastern Ross Sea outer continental margin. The seismic facies between RSU3 and RSU2 were compared with lithostratigraphy and physical properties from sediment core and downhole logging results of Site U1522. The RSU3 and RSU2 seismic reflectors were traced into the eastern and central Ross Sea outer continental shelf, slope, and rise using the information from IODP Exp. 374, DSDP Leg 28 sites and additional seismic lines collected since 1995, including the data acquired during the OGS Explora Expedition in 2017 and the Araon Expeditions in 2013, 2015, and 2019. This constitutes a major improvement as well as a spatial extension that builds upon the paleobathymetric maps produced in the framework of the ANTOSTRAT project. Spatio-temporal distributions of seismic facies, stratal geometry, and the location of the sediment depocenters provide useful insights into the paleodepositional environment, influenced by subglacial, ice-proximal and ice-distal glaciomarine processes. Those new maps, combined with drill site data, will help to understand the characteristics of sedimentary stacking patterns and the paleoshelf break evolution in different areas of the Ross Sea. In fact, this area has been influenced by the activity of different ice-streams from the late Miocene to early Pliocene periods. The new paleobathymetric maps will serve as boundary conditions to ocean and ice sheet modeling and improve the understanding of ice-sheet-ocean interactions during this period and in particular the interplay between East and West Antarctic ice sheet.



## PROGRAM

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### S12-I

#### Geological records of ocean and ice sheet change from the Ross Sea

Room #302

|                                 |  |
|---------------------------------|--|
| Date&Time                       | July 22 (MON), 11:00-13:00   |
| Convener                        | Denise Kulhanek, Laura De Santis, Rob McKay, Sunghan Kim   |
| Chairperson                     | Denise Kulhanek, Sunghan Kim   |
| 11:00-11:30<br><i>* Keynote</i> | <b>A045 Ice-sheet ocean interactions at Hillary Canyon through time (Eastern Ross Sea, Antarctica)</b><br><i>Florence Colleoni Istituto Nazionale di Oceanografia e Geofisica Sperimentale, Italy</i>  |
| 11:30-11:45                     | <b>A052 Miocene ice sheet oscillations in the Ross Sea embayment based on preliminary results of log-seismic correlations</b><br><i>Lara Perez British Antarctic Survey, United Kingdom</i>  |
| 11:45-12:00                     | <b>A249 Antarctic ice-sheet behavior in the Ross Sea outer continental margin in the late Miocene to early Pliocene from preliminary results of regional seismic stratigraphy and IODP Site U1522</b><br><i>Sookwan Kim Korea Polar Research Institute, Korea</i>                                  |
| 12:00-12:15                     | <b>A231 The ODYSSEA Contourite Depositional System. Interpretation of seismic reflection profiles collected between the Iselin Bank and the Hillary Canyon (Ross Sea).</b><br><i>Rudy Conte Ca Foscari University of Venice/Istituto Nazionale di Oceanografia e Geofisica Sperimentale, Italy</i> |
| 12:15-12:30                     | <b>A393 Pleistocene deep-water oxygenation during interglacial events in the Ross Sea, Antarctica: palaeomagnetic results from IODP Exp. 374</b><br><i>Tim Van Peer University of Southampton, United Kingdom</i>  |
| 12:30-13:00<br><i>* Keynote</i> | <b>A351 Early to middle Miocene oceanographic conditions in the Ross Sea, Antarctica</b><br><i>Amelia Shevenell University of South Florida College of Marine Science, USA</i>   |