

Antarctic Ice Sheets' dynamics: new data from provenance analysis of IODP374 cores in the Ross Sea

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Scope

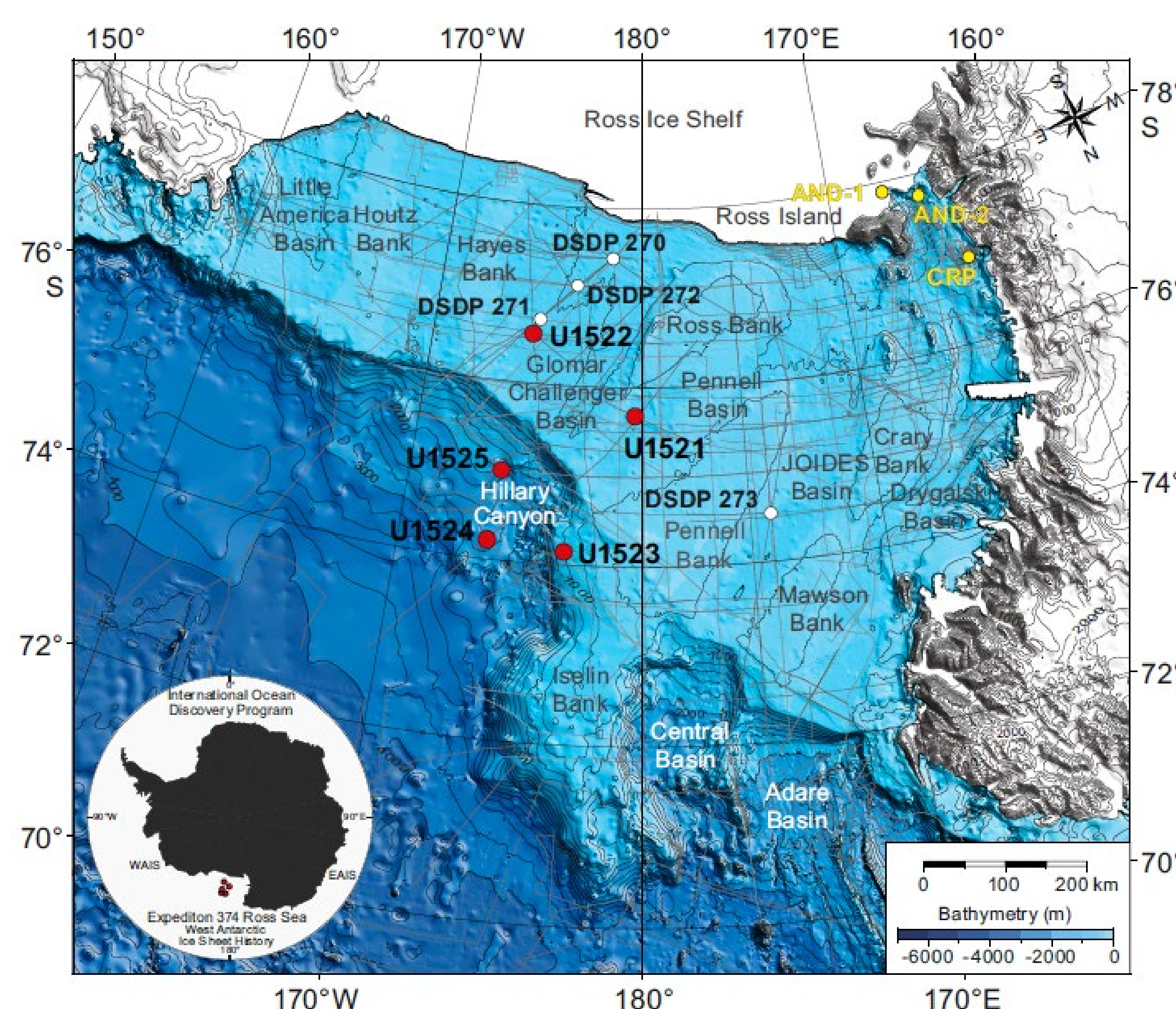
The main purpose of the proposed research as shore-based members in the **IODP 374 Expedition "Ross Sea West Antarctic Ice Sheet History"** (co-chiefs R. McKay –L. De Santis) is:

- investigate the mechanisms of interaction between glacial processes, sedimentary processes, and climate evolution, which control sediment transport and origin, the evolution of the topography and the fluctuation of the glacial masses
- define, in the central and eastern Ross Sea (Antarctica), the cryosphere's behavior and paleoenvironmental variability during the time interval between Miocene and Pleistocene

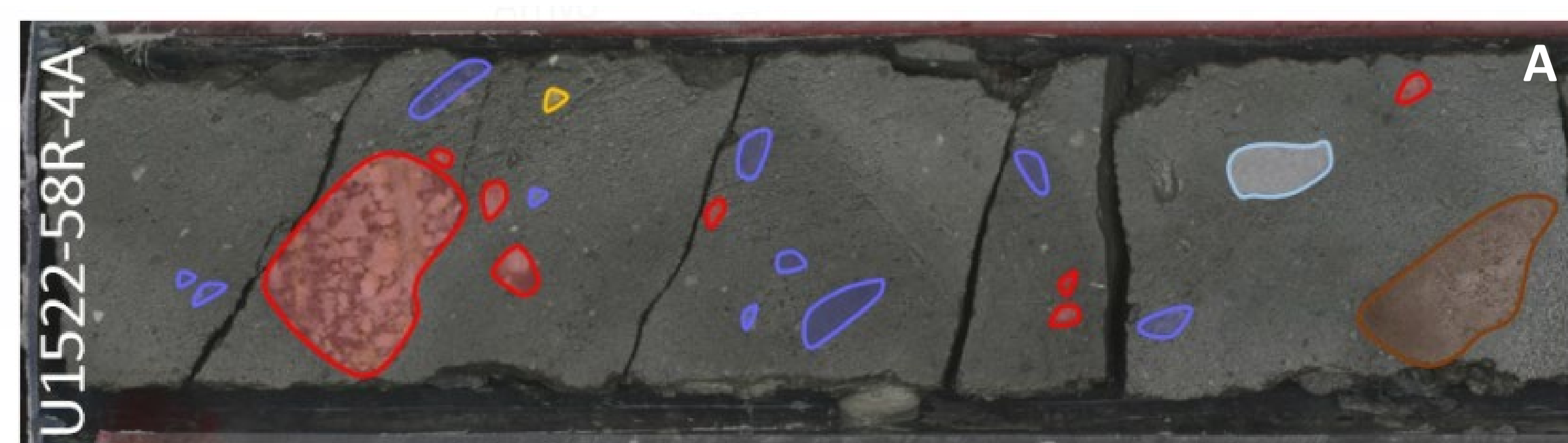
Main activities

As shore-based members, the main activities carried out have been:

- Sampling IODP 374 cores** (gravel-size clasts and bulk sediments) at IODP Gulf Coast Repository in College Station (Texas, US)
- Petrofacies analysis and distribution**, petrographic-compositional analysis of the gravel; mineral chemistry and geochronological analysis on selected clasts.
- Scientific meetings** and post-cruise meeting (to be held in Trieste in September 2023)



Ross Sea map showing the IODP Exp 374 drilling sites



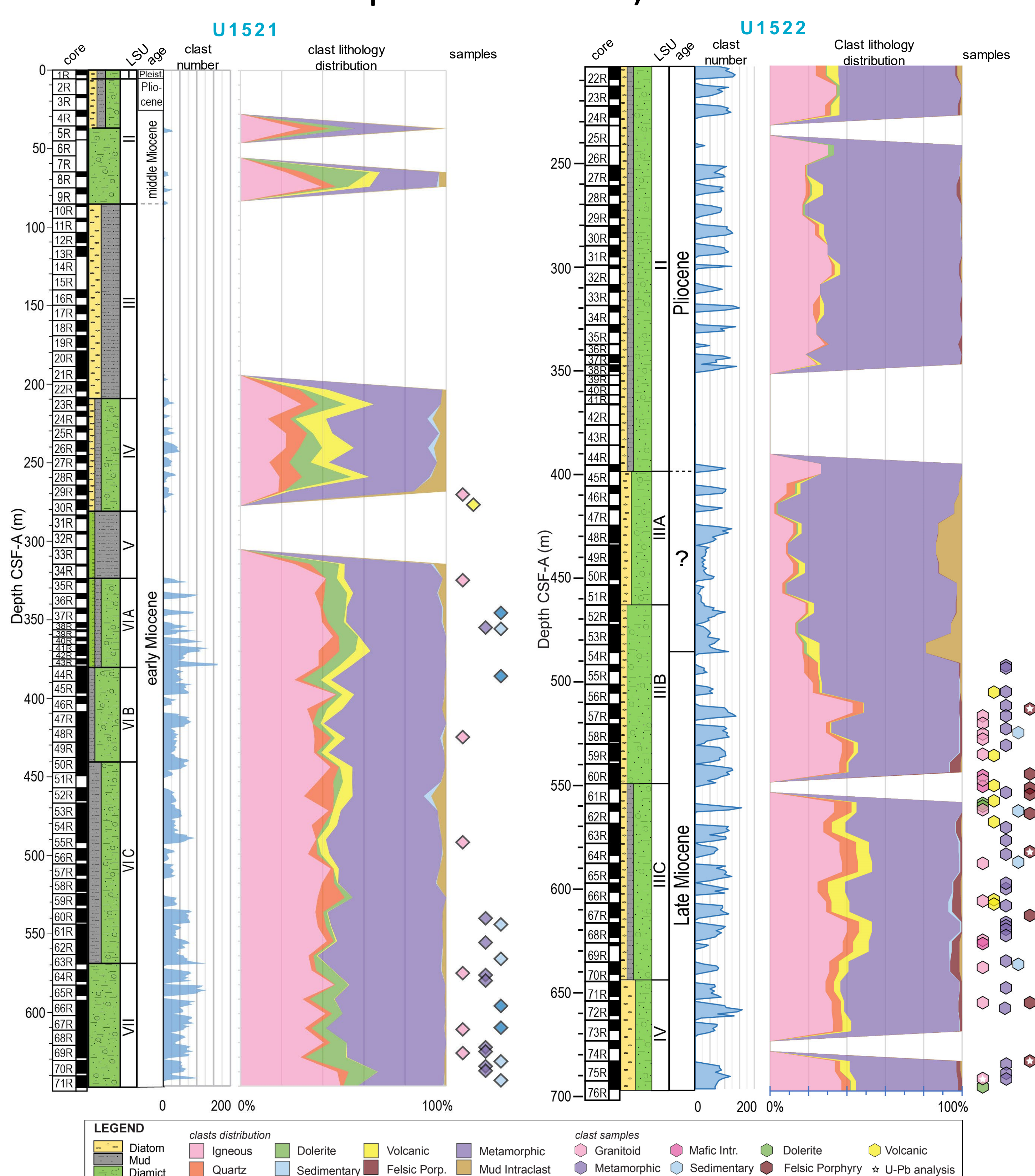
A) Clast logging of a diamictite interval; B) Granitoid clast: macroscopic view and thin section

Remarks

- U1521 and U1522 sites have been completely logged and sampled following the proposed methodologies
- Changes in distribution of petrofacies follows environmental and climatic changes, revealing different eroded areas (i.e., West Antarctica vs Transantarctic Mountains)
- Shifts in sediment provenance revealed by the association of geochemical, geochronological, and petrographic proxies from IODP U1521 core during the Early Miocene highlights the evidence of an expanded West Antarctic Ice Sheet at 17.7 Ma

Published results

- Marschalek, J.W. et al., 2021, A large West Antarctic Ice Sheet explains early Neogene sea-level amplitude: *Nature*, v. 600, p. 450–455
- Zurli, L., et al., 2022, Data Report: Petrology of gravel-sized clasts from Site U1521 core: *Proceeding of the International Ocean Discovery Program 374*
- Sullivan, N. B., et al., *submitted*. Obliquity Disruption and Antarctic Ice Sheet Dynamics over a 2.4 Myr Astronomical Grand Cycle



Clast abundance and clasts lithology distribution in the cores U1521A and U1522A