Contribution ID: **340** Type: **Oral presentation**

KEYNOTE: How and why does CO2 change? Oceanic records of deep carbon storage and surface CO2 within and beyond the ice core record

Friday, 7 October 2022 10:30 (30 minutes)

CO2 records from Antarctic ice cores lay down two fundamental challenges to the paleoceanographic community. First, can CO2 records be found in the ocean that mirror the atmosphere, reflecting glacial-interglacial carbon storage and release? Secondly, can oceanic reconstructions be used to extend the record of CO2 change beyond the reach of the oldest ice? Here I present recent efforts by our group to address these challenges, using the boron isotope proxy for paleo pH and CO2. On glacial-interglacial timescales, our data demonstrate the importance of Southern Ocean processes in CO2 storage, achieved both by decreased CO2 outgassing from the surface, and increased remineralised carbon at depth. On millennial to centennial timescales, our data show how glacial carbon storage broke down, with CO2 released to the atmosphere from each high latitude ocean basin at different times. Finally, we show new reconstructions of CO2 beyond the current reach of the ice cores, highlighting the role of the carbon cycle in the intensification of the ice ages at the Mid-Pleistocene Transition.

Primary authors: RAE, James (University of St Andrews); BURKE, Andrea (University of St Andrews); Dr CRUMPTON-BANKS, Jessica (University of St Andrews); LITTLEY, Eloise; NUBER, Sophie; Ms SHANKLE, Madison (University of St Andrews); XU, Chen

Presenter: RAE, James (University of St Andrews)

Track Classification: Biogeochemical Cycles in the Earth system –data and models