Antarctic Science International Bursary *Report*
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In 2018 I was awarded an Antarctic Science International (ASI) bursary of £4750 to study the dynamics and provenance of Pleistocene Ice-Rafted Debris (IRD) in the Southern Ocean. IRD is the term given for fragments of rock and mineral grains deposited on the seafloor by melting sea ice or icebergs, and the accumulation of these grains over time provides a valuable geological archive of past iceberg activity. Using sediment cores from the Subantarctic Zone south of South Africa (IODP Site U1475), this project reconstructed the accumulation and mineralogy of IRD across glacial-interglacial cycles of the past 1.65 Million Years. The ASI bursary facilitated a research visit to the Lamont Doherty Earth Observatory (LDEO) at Columbia University, New York, to work closely with Professor Sidney Hemming, a leading expert in the field of iceberg reconstructions and paleoclimate. During this stay (in Autumn/Fall of 2019), I was able to use geochemical and petrochemical laboratories at LDEO to gather a range of data and observations regarding the accumulation and composition of the IRD at our study site. Furthermore, the collaboration with Professor Hemming during this stay contributed towards the publication of a peer-reviewed publication in the journal *Nature* (Starr et al., 2021), receiving attention from various news outlets (e.g. Sky News, The Guardian, The Independent), and resulting in a BBC Radio Wales "Science Cafe" episode in which myself and Professor Ian Hall (my PhD Supervisor) were guests. This paper reported a previously unknown feedback in the climate system, whereby the melting of Antarctic icebergs during the onset of glacial periods can trigger large-scale shifts in ocean circulation. The development of this theory would not have been possible without the analytical resources at LDEO, but more importantly, without the collaborations made possible in part by the ASI bursary. Furthermore, during my time at LDEO, I worked additionally with Professor Gisela Winckler, with whom I explored the use of novel geochemical proxies in determining the flux and provenance of IRD in the past. Through this endeavour, we collected Helium isotope data for a range of IRD samples from Site U1475, which we hope will act as a pilot study for the purpose of future research proposals.