

## Opportunities for 2D materials to facilitate research in extreme environments

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In Antarctica, temperatures reach almost  $-90\text{ }^{\circ}\text{C}$ , winds rise to over 300 km/h, and the average elevation is 2500 m. It holds the key to understanding the environmental history of our planet and our impact on it, and is an ideal location to study everything from biology and glaciology to geomagnetism and astronomy. However, such an inhospitable environment poses countless problems for the researchers who work there and the logistical teams that support them. In this presentation, I will recount my experience of a year spent at the Franco-Italian research station, Concordia, isolated on the Eastern Antarctic Plateau at an elevation of 3300 m and a distance of 1200 km from the coast, from the unique perspective of a materials scientist. I ask the question, how can 2D materials facilitate research in a location such as this, considering such themes as energy generation and storage, smart clothing, and de-icing. In pushing technologies to their limits, we can not only support current research at the Poles and high altitudes but also prepare ourselves for other hostile environments that we will find as we continue our exploration of Space. These potential new applications of 2D materials emphasise the benefits of looking outside our own bubble for new research and industrial opportunities.

### Figures



**Figure 1:** Photos of Concordia station and the surrounding scientific and logistic laboratories and warehouses (left); and the caravan of tractors that resupplies the base in a 1200 km journey from the coast 2-3 times per year (right).