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# KlimaCampus Kolloquium

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## The Seeds of Ice in Clouds

The formation of ice in clouds is fundamentally important to life on our planet since cold clouds play a central role in climate and the hydrological cycle. Despite the significance of ice formation, our quantitative understanding of sources, properties, mode of action and transport of Ice-Nucleating Particles (INP) is remarkably poor. In this seminar I will review some of the advances we have made over recent years, focusing on improving knowledge of mineral dust INPs from deserts through laboratory and modelling work as well as using aircraft and ground stations on either side of the tropical Atlantic. As part of this, I will illustrate how we cross scales from laboratory research where we can identify nanoscale ice nucleation sites through to planetary scale modelling of INP and interaction with cloud fields. In addition, I will present some of our recent modelling work where we have shown that the correct representation of INP concentrations in shallow cold-sector clouds over the Southern Ocean is critical for their representation. Many global models are structurally incapable of allowing clouds to persist in a highly supercooled state and therefore are unrealistically insensitive to INP concentrations. Supercooled Southern Ocean clouds help illustrate the importance of INP concentrations throughout our planet's atmosphere and why we need to consolidate our effort in quantifying atmospheric INP, predicting their changes in the future and correctly representing them in weather and climate models.

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