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The influence of clouds and aerosols on climate

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Clouds are scientifically challenging because their formation requires both knowledge about the large-scale meteorological environment as well as knowledge about the details of cloud droplet and ice crystal formation on the micro-scale. The ice phase in clouds remains enigmatic because ice crystal number concentrations can exceed the number concentrations of those aerosol particles acting as ice nucleating particles (INP) by orders of magnitude. Aerosol particles can scatter and absorb radiation and with that cause a cooling, that partly offsets the greenhouse gas warming. Aerosol particles also influence the microphysics of clouds by acting as cloud condensation nuclei and INP. The radiative forcing of anthropogenic aerosol particles has the largest uncertainty of all anthropogenic forcings and yet is being exploited in climate engineering approaches. With his research Jon Egill Kristjansson contributed a lot to the understanding of various aspects of aerosol-cloud-climate interactions that I'll address in my talk. He also was a main driver for the EU PF7 BACCHUS project, from which results will be presented in the session AS1.35 (Clouds, Aerosols, Radiation and Precipitation).