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**Understanding aerosol-cloud interactions**

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The effects of aerosols on clouds (known as the “aerosol indirect climatic effect”) are thought to have a net climatic cooling effect which partially offsets greenhouse gas warming. Regional impacts of aerosols on precipitation and cloudiness can be even stronger. Despite its importance, the complex and multi-scale nature of aerosol-cloud interactions makes quantitative assessments of the indirect effect one of the most uncertain components of anthropogenic climate change. This talk will present the approaches used to observationally study them and represent them in models. We will provide an assessment of what has been learned and point out key research challenges for the future.