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## From weather to climate predictions

Current state-of-the-art weather forecasts are able to provide skillful and useful predictions of weather up to approximately 10 days in advance. Beyond this time horizon, the unpredictable component, or the weather noise, that arises from the growth of the initial uncertainty, becomes larger. As a consequence, predictions must be probabilistic in nature. Climate predictions are inherently probabilistic statements about future climate conditions on timescales ranging from seasons to decades, and on spatial scales ranging from local to regional and global.

While weather and climate predictions rely on a good knowledge of the current state of the climate system as the initial condition, the initial state of the atmosphere is of no crucial importance for climate projections. Rather, climate projections, which relate to time scales from decades up to more than 100 years ahead, are meant to describe plausible and internally consistent but not necessarily probable futures.

For climate predictions, the source of long-range predictability within the atmosphere is usually associated with the existence of different modes of low-frequency variability such as the El Nino Southern Oscillation, the North Atlantic Oscillation and monsoon rains. It is expected that, if models are capable of reproducing these phenomena, they may also be able to predict them. In this talk, we will review recent advances in climate prediction and discuss the challenges of providing skillful and useful predictions at these time scales.