

How can the stratosphere help us predict the weather several weeks ahead?

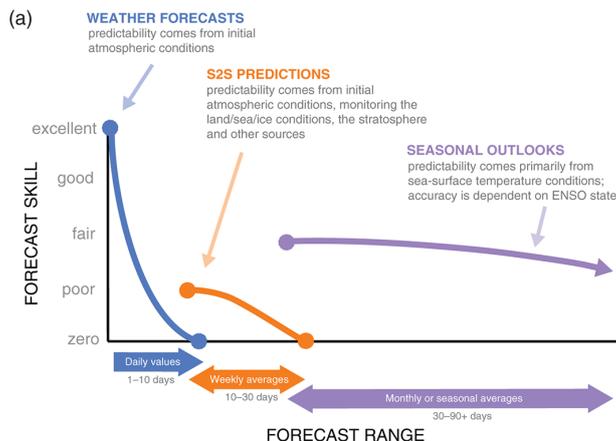
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It is now widely accepted that, during winter, winds in the stratosphere (more than 30km above the surface) play a significant role in determining winter weather patterns in the North Atlantic. Since the stratosphere varies on monthly timescales during the winter, this means the stratosphere can be used as a significant source of information for forecasts which extend beyond the typical two-week timescale in common use around the world (Tripathi, 2015). Less well understood is why and by how much different weather regimes in the troposphere are influenced by stratospheric changes.

This project will use a large archive of previous model forecasts from ten operational monthly forecast models and our own simulations to develop a more detailed understanding of coupling between the stratosphere and troposphere. Ultimately, the understanding developed in the project will help modelling centres to improve the skill of their models on the 10-30 timescale and forecasters to better anticipate the role of the stratosphere in driving winter weather.



Qualitative estimate of skill available based on the forecast range. The orange line and description shows the sub-seasonal forecast range which is the focus of this project (taken from White et al., 2017). There is a great deal of potential to improve forecasts on this time scale.

Training opportunities:

The student will spend 1-2 months per year working at the University of Oklahoma with Dr Furtado and his group. This will also give the student the opportunity to attend conferences in the USA in each year of the project. There will also be opportunities to work with colleagues at the European Centre for Medium-Range Weather Forecasts.

Student profile:

This project would be suitable for students with a degree in physics, mathematics or a closely related environmental or physical science.

References:

Tripathi et al. (2015) doi:10.1088/1748-9326/10/10/104007

<http://www.reading.ac.uk/nercdtp>