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The infrared spectrum - measurement, modelling and information content

Tuesday, 8 March 2022 08:45 (1h 15m)

This lecture gives an overview of the atmospheric infrared spectrum. The main spectral regions are discussed: the long-wave (15um) and short-wave (4um) CO2 bands providing temperature information, the ozone band at 9um, the water vapour band around 6um and finally the window regions. The measurement of the infrared spectrum by the primary operational sounders (IASI and CrIS) is described, highlighting the different compromises made between measurement noise and spectral resolution. The key challenges associated with using the IR spectrum are discussed with particular emphasis on cloud and non-linearity. The lecture includes several practical exercises where ECMWF model fields and the RTTOV radiative transfer scheme are used to simulate IASI spectra and Jacobians in different atmospheric conditions.

Presenter: MCNALLY, Tony (ECMWF)