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Transport And Mixing in the Atmosphere

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Transport and mixing of atmospheric chemical species is a vital part of the chemical-climate system. Transport and mixing processes in the atmosphere operate on scales from millimeters to thousands of kilometers. In certain parts of the atmosphere the large-scale ‘layerwise two-dimensional’ flow appears to play the dominant role in transport and in the stirring process that leads ultimately to true (molecular) mixing at very small scales. There is therefore much in common with fluid dynamical topics such as ‘chaotic advection’ or ‘Batchelor-regime turbulence’. My lecture will describe how, with appropriate modification, some of the theoretical tools developed in these contexts can be used, in conjunction with observational data on large-scale velocity fields or on chemical species, to quantify different aspects of transport and mixing in the atmosphere.

View the extended summary