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Determination of global-scale diffusion coefficients in the stratosphere using a new model of local mixing

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Due to the intermittency and spatial distribution of small layers of turbulence in the stratosphere, determination of large-scale diffusion coefficients is a non-trivial process. Previous models have assumed that all layers are perfectly mixed, but generally spatio-temporally disconnected. Our new model allows for partially mixed layers, especially for large and intense layers, which has profound effects on the global-scale diffusion coefficient. We also better represent the spatio-temporal distribution using a 2-dimensional model, as distinct from the more common one-dimensional model. Our newer model is used in combination with balloon and aircraft measurements of layer thicknesses and distributions to place limits on the possible values of large-scale diffusion in the stratosphere and upper troposphere. The values in the stratosphere are particularly well confined.

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