



Atmospheric energy exchange across scales in a global climate model

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Atmospheric kinetic energy (KE) is predominantly generated at large synoptic scales due to baroclinic instability. We determine the spectral decomposition of the global budgets of KE and available potential energy following Augier (2013). Furthermore, we extend their formulation to quantify the nonlinear energy exchange across scales in EC-Earth 2.2 at ~ 25 km horizontal resolution. Our results indicate a downscale KE cascade at scales smaller than the synoptic scales, together with a smaller but continual upscale KE transfer toward the synoptic scale. We show that the upscale KE transfer toward the synoptic scale is virtually absent in the same model at a lower resolution (~ 125 km) and compare the global energy budget between both resolutions.