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Eddy diffusion and meridional circulation in a periodic QG model

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Eddy transport of (layer) thickness is often modeled using eddy diffusion. Here, a two layer quasigesotrohic flow is considered in a periodic domain with bottom topography. Forcing takes the form of an imposed uniform vertical shear and dissipation is primarily via bottom drag. Different estimates of eddy diffusivity – defined alternately as a scalar or a tensor and as global or spatially varying— are presented. We also compare two interpretations of the quasigeostrophic equations in this periodic context. In one, the shear is imposed, implying that the strength of the meridional overturning cell is part of the solution; in the other, the meridional cell is specified and the shear is allowed to vary.