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# Bottom Ekman Pumping with Stress-Dependent Eddy Viscosity

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### ABSTRACT

This paper reconsiders the classic problem of bottom Ekman pumping below a steady geostrophic flow by relaxing the assumption of a constant eddy viscosity. It is assumed instead that the eddy viscosity depends on the magnitude of the bottom stress, which itself is a function of the geostrophic flow. Results show that the vertical Ekman pumping is no longer directly proportional to the relative vorticity of the geostrophic flow, but is a far more complicated function of the geostrophic flow. Specific examples are discussed, which show that the Ekman pumping rate may be 50% or 100% larger than that predicted by the traditional theory.

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