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Ocean Eddies - I - effects of rotation and density variations

Ocean Eddies - II - effects on plankton

The ocean is an active field of eddies and jets that arise from a combination of surface forcing and dynamical instabilities. The eddying flow is responsible for the transport of heat and chemical properties. Their dynamics shapes the oceanic ecosystems and plays an important role in our climate. In the first lecture, I will review some interesting aspects of oceanic dynamics at scales of 1-100 km; in particular, the effect of rotation and buoyancy contrasts arising from variations in temperature and salinity. In the second lecture, I will examine the transport and mixing of reactive tracers by this flow field. The alteration of chemical constituents, such as carbon, oxygen, and nitrogen by the growth and respiration of plankton, combined with their transport, results in constraining the earth's carbon cycle and climate as we know it today.