



The circulation and dynamics of the continental shelf is dramatically modified in the presence of a submarine canyon. The typical alongshore geostrophic flow is weakened over the canyon head and the dynamics becomes nonlinear with the advection being balanced by the ageostrophic term. As a result, enhanced onshore flow and upwelling occurs over the head of submarine canyons — it could be orders of magnitude higher than a shelf without the presence of a canyon. The implications on the fluid dynamics of the shelf are multiples as recirculation cells and pools of dense water are developed primarily on one side of the canyon.

Other implications involve the transport of tracers (e.g. nutrients) and the advection of hypoxic waters over the continental shelf.