



## **On the momentum balance in the Yucatan Channel**

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### **Abstract**

The horizontal momentum balance in the upper layer of the Yucatan Channel is assessed for a period of 22 months between September of 1999 and June of 2001. The subsurface current fluctuations are analyzed from ADCP measurements obtained at eight moorings across the channel, pressure measurements from tide gauges in two locations across channel, QUICKSCAT winds and TOPEX/POSEIDON altimetry data. The across-channel momentum balance is mainly geostrophic in that along-channel velocity is balanced by the across-channel pressure gradient, with the wind stress and frictional terms playing a minor role; The advective and local acceleration terms appear unimportant. Interestingly, the along-channel balance is dominated by cross-channel velocity and the pressure gradient, implying also a mainly geostrophic balance in the along-channel direction but with a significant frictional term contribution and the wind stress, local acceleration and advective terms playing a minor role. The first and second empirical modes of sea level anomalies obtained from altimetry are in agreement with the first and second modes of the along-channel flow variability and appear related with the propagation of eddies through the channel.