[Abstract]: A three-dimensional coastal ocean model was implemented to investigate the circulation and spatial distribution of ventilation pathways within Hervey Bay, a large coastal embayment off the central Queensland coast. Ventilation time scales are often utilised to characterise the water renewal process of coastal embayments, estuaries and large ocean basins. The impact upon the coastal ocean due to population growth, tourism, fishing, aquaculture, coastal industries and other constructions is immense and knowledge of these time scales assists in assessing the water quality of the marine environment. Ventilation time scales computed for Hervey Bay varied between 50 and 180 days and depended strongly on bathymetry, model forcing, and horizontal mixing parameterisation. Ventilation time scales exhibited strong spatial variability. About 90% of the Bay was ventilated after about 50-80 days. The concept of one ‘typical’ distinct ventilation timescale characterising this particular coastal embayment is oversimplified and consideration of spatial variability is clearly important.