

## ICTS Seminar

- Title : The role of submesoscale coherent structures in vertical transport at an upper-ocean front
- Speaker : Vicky Verma (University of California San Diego, California, USA)
- Date : 30<sup>th</sup> January 2021
- Time : 10:30 am
- Abstract : The coherent structures such as vortex filaments and eddies are crucial features of submesoscale (0.1 km - 10 km) dynamics and play a significant role in vertical transport. We employ LES simulations of an isolated upper-ocean density front, which is initially in thermal wind balance, to study the submesoscale dynamics dominated by coherent structures. In the model setup, the submesoscale coherent structures develop through the nonlinear evolution of baroclinic instability. The finescale (scales smaller than  $O(100)$  m) with relatively fast dynamics are also generated, primarily in the vortex filaments. We find that the induced secondary circulation in the lateral-vertical plane, which is responsible for restratifying the front, has a three-dimensional organization, and it correlates with the spatial organization of the coherent structures. To further investigate the coherent transport pathways and ascertain whether the fast finescale dynamics or the slower submesoscale dynamics control vertical transport, Lagrangian tracer particles are released at the front. The collective motion of particles helps identify the typical features of transport. Additionally, by tracking clouds of particles, we show that their centers of mass downwell/upwell over 1-2 inertial time periods and an adjustment follows subsequently with a sub-inertial time scale, suggesting the control of submesoscale dynamics on the vertical transport and restratification of the front.
- Venue : Please click on the link to join the seminar  
<https://zoom.us/j/99194023311?pwd=WExpditjWm1JZmZaZGIEMjNkUtxZz09>  
Meeting ID: 991 9402 3311  
Passcode: 155495