WHAT DO WE KNOW?

Role and effects:

- CEs/AEs transfer large amounts of heat, mass, momentum and biogeochemical properties from their regions of formation to remote areas where they impact budgets of the tracers and influence the ocean-atmosphere interactions and Earth´s climate [*Bryan*, 1996; *Wunsch*, 1999; *Roemmich and Gilson*, 2001; *Jayne and Marotzke*, 2002; *Qiu and Chen*, 2005].

- the **vertical movements observed in the interior of CEs/AEs can transport, mix and vertically redistribute these tracers** and impact their global budgets [*Falkowski et al.*, 1991; *McGillicuddy et al.*, 1998 ; *Sieggel et al., 1999 ; McGillicuddy et al.*, 2007 ; *Klein and Lapeyre*, 2009].

- Through the physical and biological environments can impact the whole marine ecosystem from plankton distribution to higher trophic levels [*Bakun*, 2006, *Logerwell and Smith*, 2001; *Seki et al.*, 2002; *Domokos et al.*, 2007; *Spear et al.*, 2001; *Yen et al.*, 2006; *Cotté et al.*, 2011].

THE PCCS: WHAT DO WE KNOW?

Observations : From altimeter signals [*Chelton et al.*, 2007; *Chaigneau et al.*, 2008; 2009], color satellite images [*Correa-Ramirez et al.*, 2007], surface-drifter trajectories [*Chaigneau and Pizarro*, 2005c].

- Effort addressed to describe the main horizontal structure/kinematic properties and their potential implication for the transport of sea-water properties.
- Principally formed near the south-American coast where they locally impact the heat and salt budgets through lateral turbulent fluxes [*Chaigneau and Pizarro*, 2005b].
- propagate seaward with translation velocities of few cm s^{-1} due to a combination of mean flow advection and self-propagation [*Chaigneau and Pizarro*, 2005c; *Chaigneau et al.*, 2008; 2009].
- In this new environment, eddies appear as anomalous water masses with surface or subsurface T/S anomalies [e.g. *Johnson and McTaggart*, 2010].
- The westward propagation of CEs can also extend the area of high biological productivity offshore by both eddy chlorophyll advection and eddy nutrient pumping [*Correa-Martinez et al.*, 2007].

- The CE core have typical T/S anomalies of ~-1°C/-0.1 *(Chaigneau and Pizarro,* 2005)
- The AE core, located in the subthermocline contains anomalous signature of the ESSW originated from the PCU. These AEs show a subsurface radial velocity maximum and volume transports around the eddy centers were estimated to be on the order of 2 Sv (*Johnson and McTaggart;* 2010).

SUMMARY (Hormazabal et al., 2004; Chaigneau and Pizarro, 2005; Correa-Ramirez et al, 2007; Chaigneau et al., 2008; 2009)

- The mean eddy surface characteristics (radius, vorticity, propagation velocity, lifetime)
- Their propagation patterns (generation near the coast and propagation westward) and the temporal evolution of their mean properties
- Their importance for the cross-shore transport of seawater properties from coastal regions to the offshore ocean