

## Multi-Sensor Study of the Mediterranean Outflow and Meddies at 1000-Meter Depth

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Previous studies of the Mediterranean outflow and meddies (O&M) were limited by poor spatial and temporal resolution of the conventional observations. Little is known about meddies formation and transport, and the spatial and temporal variation of its trajectories. Generally speaking, most of the satellite observations are confined to the ocean's surface or its surface layer, while meddies were located, on an average, at a depth of 1000m. We developed a new remote sensing method to observe and study the O&M through unique approaches in satellite multi-sensor data integration analyses. Satellite altimeter, scatterometer, SST and XBT data were used to detect and calculate the trajectories and the relative transport of the O&M. Two experiments [A Mediterranean Undercurrent Seeding Experiment (AMUSE) and Structures des Echanges Mer-Atmosphere, Proprietes des Heterogeneites Oceaniques: Recherche Experimentale (SEMAPHORE)] from 1993 to 1995 were used to validate our method. Monthly mean features of the floats in meddies and our method were amazingly well agreed with each other. We found that more northwestward meddies occurred in the spring and more southward meddies occurred in the fall than previously thought. Streamfunctions using T/P altimetry and time-frequency energy distribution using Hilbert-Huang Transform (HHT) were computed to evaluate the meddy interactions with sea surface. Since the O&M play a significant role in carrying salty water from the Mediterranean into the Atlantic and contribute to the North Atlantic Deep Water (NADW) formation, such new knowledge about their trajectories, transport and life histories is important to understand their mixing and interaction with the North Atlantic water, and hence, to lead to a better understanding of the global ocean circulation and the global change.