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Salt Finger Mixing in the Western Mediterranean Sea

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Deep wintertime convection in the western Mediterranean in 2005-06 created a thick layer of warm, salty new deep water beneath the fresher, colder, older deep water. Repeat surveys over the years 2006, 2008 and 2010 reveal that the transition region between the old and new deep waters becomes progressively warmer and saltier. The increases in temperature and salinity of this transition region represent a convergence of heat and salt that is quantifiable from the repeat surveys. These increases in temperature an salinity are likely due to salt finger mixing processes that transport heat and salt downward through the halocline-thermocline that connects the Levantine Intermediate Water at about 400 m depth with the deep waters below 1500 m. Here the observed layer and step structure characteristic of salt finger mixing in the halocline-thermocline is described. The estimated downward heat and salt fluxes are used to explore how these fluxes relate to the vertical gradients within the layer and step structures and to the overall structure of the halocline-thermocline.