Seismic Oceanography

A New Tool to Characterize Physical Oceanographic Structures and Processes

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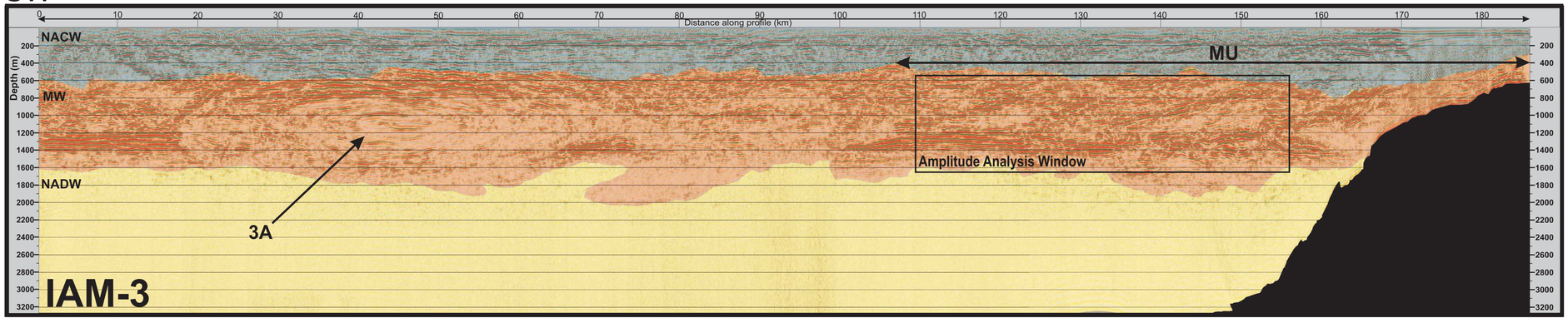
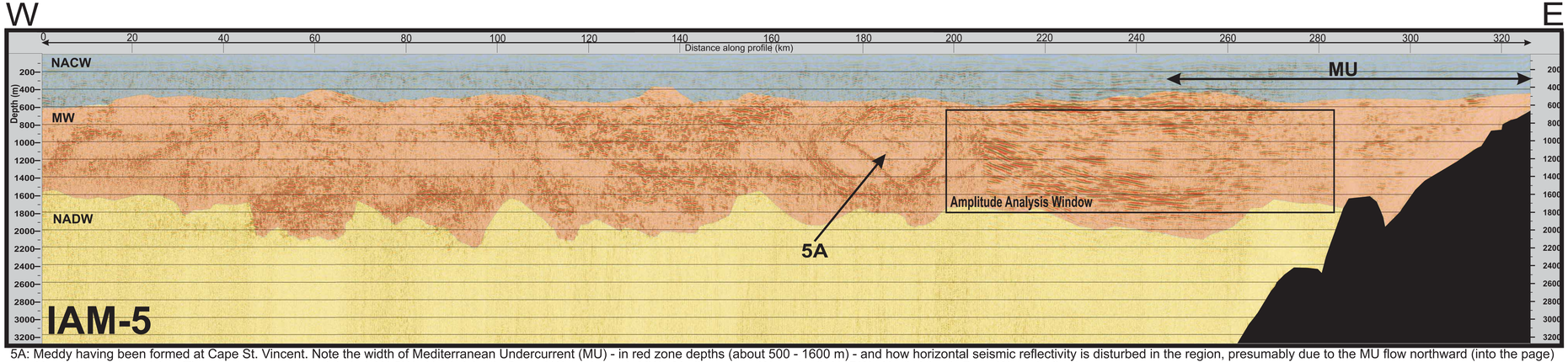
APPENDIX III

High-Resolution Seismic Sections

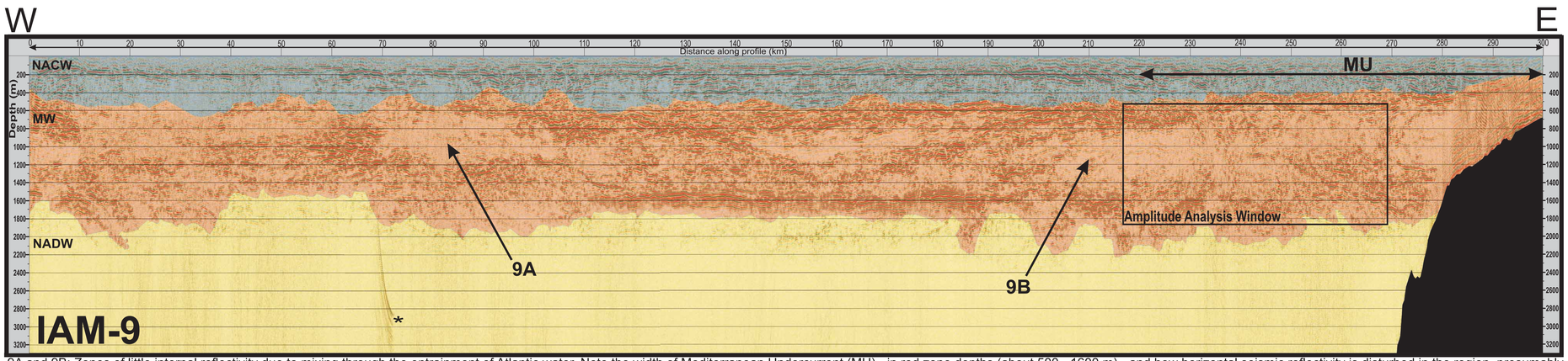
SW



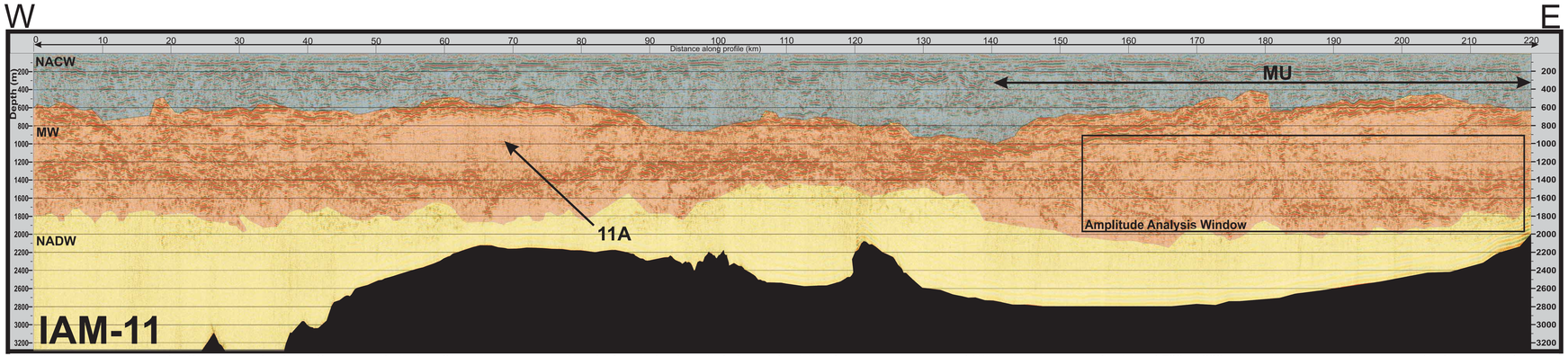
3A: Meddy having formed at Cape St. Vincent. Note the width of Mediterranean Undercurrent (MU) - in red zone depths (about 500 - 1600 m). Here, in comparison with more northern profiles, horizontal seismic coherency is smoother and stratified, indicating mixing is not thorough. Three water masses are labeled: NACW - North Atlantic Central Water (green); MW - Mediterranean Water (red); NADW - North Atlantic Deep Water (yellow).



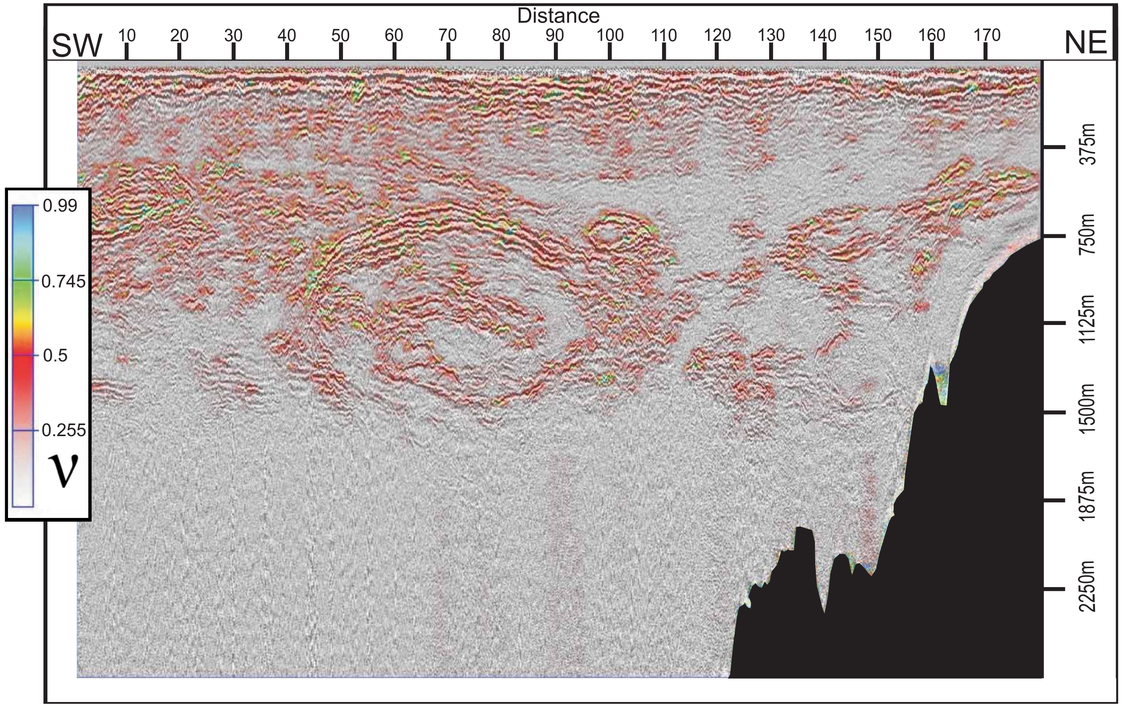
5A: Meddy having been formed at Cape St. Vincent. Note the width of Mediterranean Undercurrent (MU) - in red zone depths (about 500 - 1600 m) - and how horizontal seismic reflectivity is disturbed in the region, presumably due to the MU flow northward (into the page) resulting in increasing mixing. Three water masses are labeled: NACW - North Atlantic Central Water (green); MW - Mediterranean Water (red); NADW - North Atlantic Deep Water (yellow).



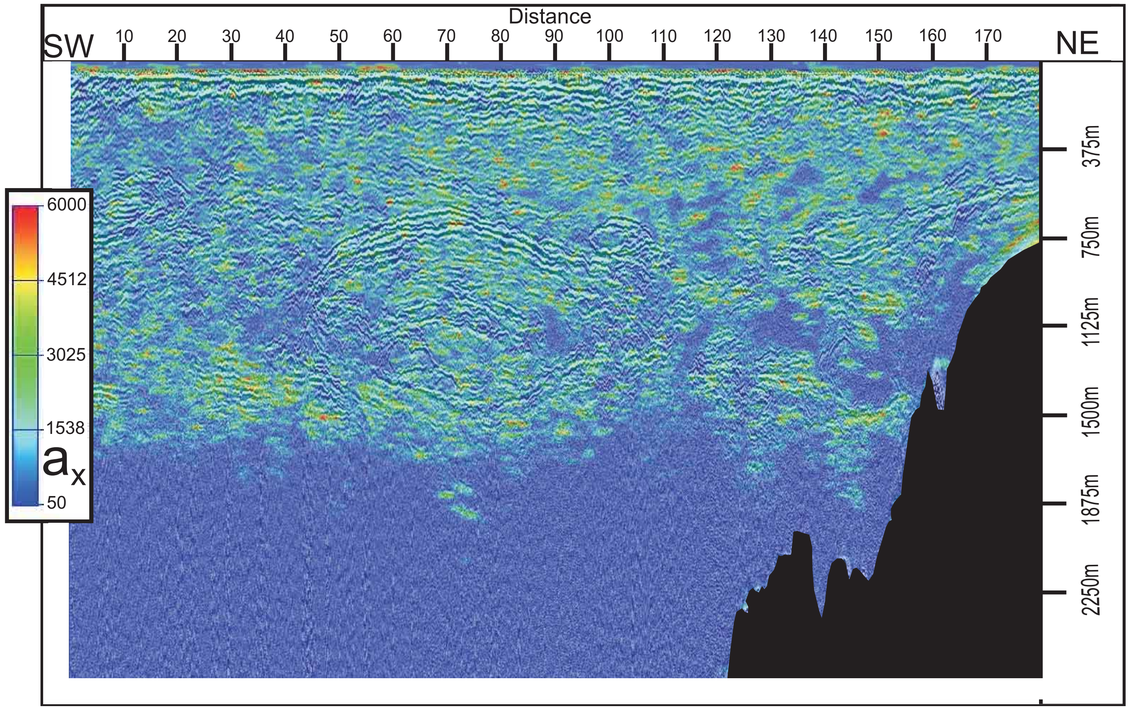
9A and 9B: Zones of little internal reflectivity due to mixing through the entrainment of Atlantic water. Note the width of Mediterranean Undercurrent (MU) - in red zone depths (about 500 - 1600 m) - and how horizontal seismic reflectivity is disturbed in the region, presumably due to the MU flow northward (into the page) resulting in increased mixing. Three water masses are labeled: NACW - North Atlantic Central Water (blue); MW - Mediterranean Water (red); NADW - North Atlantic Deep Water (yellow). * Seismic processing artifact



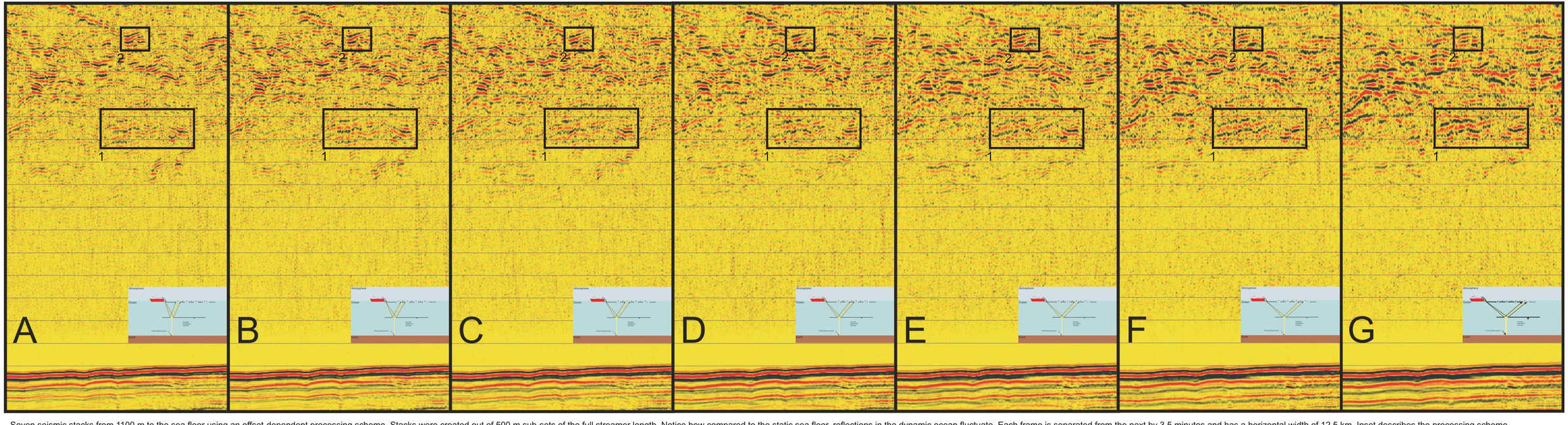
11A: Well evolved meddy with little internal structure. Compare with feature 3A, which shows significant internal structure. Note the width of Mediterranean Undercurrent (MU) - in red zone depths (about 500 - 1600 m) - and how horizontal seismic reflections are disturbed in the region, presumably due to the MU flow northward (into the page) ergo increased mixing. Three water masses are labeled: NACW - North Atlantic Central Water (blue); MW - Mediterranean Water (red); NADW - North Atlantic Deep Water (yellow).



Hurst number (ν): shown overlaid on seismic data from which it was calculated. Note the low values of the Hurst number at abyssal depths (>1500 m). The Hurst number indicates a rich range of scale lengths, which are indicative of a well-mixed regime (see Chapter 4 for details and discussion).



Horizontal correlation length (a_x) overlaid on seismic data from which it was calculated. Abyssal depths show only the smallest scales (< 50m). Therefore, being well-mixed, they have low Hurst numbers *and* small scales, that is, a rich range of the smallest scales (see Chapter 4 for details and discussion).



Seven seismic stacks from 1100 m to the sea floor using an offset-dependent processing scheme. Stacks were created out of 500 m sub-sets of the full streamer length. Notice how compared to the static sea floor, reflections in the dynamic ocean fluctuate. Each frame is separated from the next by 3.5 minutes and has a horizontal width of 12.5 km. Inset describes the processing scheme.