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North Adriatic Dense Water generation and pathways in 1999

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The preconditioning, generation and spreading of North Adriatic Dense Water (NAdDW) in 1999 is described on the basis of temperature and salinity data collected at Po River delta - Rovinj, Jabuka Pit and Palagruđa Sill profiles. Enhanced heat losses induced by cold Bora wind resulted in NAdDW generation in late January/early February 1999, being preconditioned with even stronger cold outbreak in November, which solely cooled the whole area for more than 2oC. River discharges were low in the autumn and winter, keeping the salinity high during the generation period. After the generation, NAdDW flowed as a dense current towards the Jabuka Pit along the western Adriatic slope. Its densest core interacted with the topography, being directed downslope when reaching relatively steep break west from the Jabuka Pit. The second part followed the slope as a dense current, detoured the pit from its southeastern side and hit the bottom somewhere on the eastern segment of the pit. Frictional NAdDW sinking on a slope has been successfully reproduced by a simple version of a streamtube model of dense current over a slope. Average sinking rate was estimated to be 1.1 m/km. Finally, the upper lighter part of the NAdDW current crossed the Palagruđa Sill and followed the western slope, entering the South Adriatic Pit and contributing to the water mass dynamics there. Another NAdDW branch was found at the very bottom of the middle of the Palagruđa Sill, but it was much weaker than the one that moved over the western slope.