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# Water, heat and salt transport through the Strait of Otranto

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The water, heat and salt transports through the Strait of Otranto are estimated applying direct method to historical current and hydrographical data (from December 94 through November 95). A variational inverse method based on a variational principle and a finite element solver is used to reconstruct the current, temperature and salinity fields across the Strait section from sparse measurements. The mean annual inflow and outflow water transport rates are estimated as 0.901$\pm$0.039 Sv and -0.939$\pm$0.315 Sv, respectively, and the net transport for the period of study is equal to -0.032$\pm$0.208 Sv. Thus, on a yearly time interval, the inflow and the outflow are practically compensated. The heat and salt transports due to advection process are estimated for five monthly periods, namely December 1994, February, May, August and November 1995. Considering these five periods representative of the seasonal cycle during the year, their average values show that there is a net heat advection into the Adriatic Sea on a yearly basis. The estimated value of advected heat and the corresponding error are 2.408$\pm$0.490 TW, which is equivalent to a heat gain of 17.37$\pm$3.53 W $m^{-2}$ for the whole basin. This value is compared to the heat loss of -36$\pm$152 (std) W $m^{-2}$ through the air-sea interface calculated by means of bulk formulas over the Adriatic Sea. The two values are expected to be balance each other in order to close the heat budget of the basin. The possible reasons for this difference to occur are discussed. On a yearly basis, the salt transport is estimated as an input of salt equal to $0.05\times10^{6}$ Kg $s^{-1}$. The average annual fresh water budget is estimated as -0.002 Sv, equivalent to the mass of fresh water of $2.00\times10^{6}$Kg $s^{-1}$ or to the level of 0.45 m $yr^{-1}$ for the entire Adriatic Sea. The import of salt that is less than the gain of fresh water is in agreement with the fact that the Adriatic Sea is a dilution basin.