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Large warming and salting of the Mediterranean outflow due to changes in its composition

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The Mediterranean Sea transforms surface Atlantic water into a set of cooler and saltier (hence denser) waters that, being formed in different sub-basins of the eastern and western basins, have different hydrological characteristics. Data from the 1960s-1980s have shown that the densest water outflowing at Gibraltar was a relatively cool and fresh one formed in the western basin, a situation generally thought as permanent. Here we show that the densest waters mainly outflowing since the mid-1990s were formed in the eastern basin, hence being actually much warmer ($\sim$0.3°C) and saltier (0.06) than $\sim$20 years ago. We conclude that the outflow's characteristics can vary more largely and rapidly than thought up to now (trends $\sim$+0.03°C and $\sim$+0.01 per decade), depending on the relative amounts of the different waters formed from year to year. The Mediterranean Sea functioning can thus affect markedly the mid-depth waters characteristics in the North-Atlantic. A paper is presently submitted to Nature.