Impact of the parametrisation of the bottom friction on the deep convection and general circulation of the Mediterranean Sea Jonathan Beuvier^{1,2}, Karine Béranger^{1,3}, Cindy Lebeaupin-Brossier^{1,4}, Samuel Somot², Charles Deltel³, Florent Lyard⁵, Romain Bourdallé-Badie⁶, Florence Sevault², Olivier Le Galloudec⁶, Guillaume Reffray⁶, Yann Drillet⁶, Pierre Testor³, Laurent Mortier³, Jean-Luc Fuda⁷, Isabelle Taupier-Letage⁷ 1-ENSTA/UME 2-Météo-France/CNRM 3-IPSL/LOCEAN 4-IPSL/LMD 5-LEGOS 6-MERCATOR Océan 7-LOPB EAN Institut Pierre FGOS Simon Laplace CATOR ENSTA ParisTech General description of the MED12 model rface topography and resolution of ARPERA MED12 configuration Bathymetry of MED12 (in meters) - based on NEMO (*Madec*, 2008), v3.2, 1/12° ORCA grid (6-8 km resolution), - 50 vertical levels (partial steps) 40 - exchanges with the Atlantic ocean performed through a buffer zone - climatological river forcing for 33 main rivers plus coastal runoff. Black Sea simulated as a river Averaged tidal energy E (in m²/s²) Twin simulations - from August 1998 to December 2008, ° 8 - forced (flux mode) by ARPERA, dynamical 20 downscaling of ERA40 reanalyses and ECMWF analyses by ARPEGE-Climate (50 km resolution), - Quickest+Ultimate advection scheme for tracers (Leonard, 1979, 1991 - bottom friction F including a constant (simu1) or variable (simu2) \overrightarrow{F} $=C_D\sqrt{U^2+V^2+E}\,\overrightarrow{U_H}$ raged tidal energy E Global impact of the new parametrisation sst 2004-200 Med heat conter Med salt content diff simu2 – s T3D 0-bc S3D 0-botte sss 200<mark>4-2008</mark> 05 2006 2007 simu2 diff simu2 – sir sh 2004-2008 T3D 0-150m S3D 0-150m diff simu2 - s T3D 150-600m S3D 150-600m 2005 2006 2007 diff e 2000 diff simu2 – simu1 simu S3D 600m-bottom Focus on the Gibraltar area: different pathes of MOW (see Millot 2009) 11th Februa 25th April 2005 11th February 2005 25th April 2005 rait ADC v 2005 nts at 222m depth at 222m .0.5 (b) nte et al. 2001 8.00 0.08 -1 Jan05 Apr05 Jul05 Oct05 Jan06 Apr06 Jul06 Water outflow (in Sv) at Gibralt Л u2. S and zonal current at 6°W mu2, S and zonal current at 6°W Jan 2006 Apr 2006 Jul 2006 15-day

simu2

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Ssh (in m) in the Alboran Sea

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