

16 **ABSTRACT**

17 We report on the sub-basins variability of particulate organic carbon (POC)  
18 remineralization in the western and central Mediterranean Sea during a late spring period  
19 (PEACETIME cruise). POC remineralization rates were estimated using the excess biogenic  
20 particulate barium ( $Ba_{xs}$ ) inventories in mesopelagic waters (100-1000 m) and compared with  
21 prokaryotic heterotrophic production (PHP).  $Ba_{xs}$ -based mesopelagic remineralization rates  
22 (MR) range from  $25 \pm 2$  to  $306 \pm 70$  mg C m<sup>-2</sup> d<sup>-1</sup>. MR are larger in the Alger (ALG) basin  
23 compared to the Tyrrhenian (TYR) and Ionian (ION) basins. Our  $Ba_{xs}$  inventories and  
24 integrated PHP data also indicates that significant mesopelagic remineralization occurs down  
25 to 1000 m depth in the ALG basin in contrast to the ION and TYR basins where  
26 remineralization is mainly located in the upper 500 m horizon. We proposed that the larger  
27 and deeper MR rates in the ALG basin would be sustained by an additional particles export  
28 event driven by deep convection. The TYR basin (in contrast to the ALG and ION basins)  
29 presents the impact of a previous dust event as reflected by our particulate Al water column  
30 concentrations. The ION and TYR basins are also the site of small-scale heterogeneity of  
31 stages of remineralization processes, as especially reflected by our  $Ba_{xs}$  inventories and  
32 integrated PHP data at the #Tyrr long duration station. This heterogeneity is linked to the  
33 mosaic of blooming and non-blooming patches reported in this area during the cruise.  
34 Contrastingly to the western Mediterranean Sea (ALG basin), the central Mediterranean Sea  
35 (ION and TYR basins) shows lower (intensity) and upper mesopelagic layer restricted  
36 remineralization processes during the late spring PEACETIME cruise.

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