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Investigating SWOT's capabilities to detect meso and submesoscale eddies in the western Mediterranean

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The primary oceanographic objective of the future Surface Water Ocean Topography (SWOT) altimetric satellite is to characterize the mesoscale and submesoscale ocean circulation. The aim of this study is to assess the capabilities of SWOT to resolve the meso and submesoscale in the western Mediterranean. With ROMS model data as inputs for the SWOT simulator, pseudo-SWOT data were generated. These data were compared with the original ROMS model data and ADT data from present day altimetric satellites to assess the temporal and spatial resolution of SWOT in the western Mediterranean. We then addressed the removal of the satellite's noise in the pseudo-SWOT data using a Laplacian diffusion. We investigated different parameters of the filter by looking at their impact on the spatial spectra and RMSEs calculated from the simulator outputs. To further assess the satellites capabilities, we derived absolute geostrophic velocities and relative vorticity. Our numerical experiments show that the noise patterns affect the spectral content of the pseudo-SWOT fields below 30 km. The Laplacian diffusion improves the recovery of the spectral signature of the altimetric field, especially down to 20 km. With the help of this filter, we manage to observe small scale oceanic features in pseudo-SWOT data, and in its derived variables.