



How much snow is there across the Mediterranean region?

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The seasonal snowpack plays an important role for the water budget of the Mediterranean Sea, but an exact quantification of this contribution is still elusive. This is particularly true if one compares this preliminary understanding with previous work in other semi-arid regions of the world like the western US, where both the scientific community and importantly the water-resources management sector have already achieved consensus estimates on this matter, with snow supplying 30% to 80% of annual runoff. In order to provide such figures for the Mediterranean-Sea region, we developed a 6-year (2015-2021) reanalysis of Snow Water Equivalent (SWE) at approximately 1 km resolution and daily granularity for the whole basin of the Mediterranean Sea (Nile excluded). The reanalysis uses ERA5 meteorological data and satellite-based precipitation as input for a snow model, S3M, which then assimilates daily snapshots of snow depth from the C-SNOW Sentinel-1 product. These simulations were validated using in-situ snow depth measurements across the Mediterranean-Sea region. Maps of snow water equivalent from this reanalysis were spatially aggregated to provide a preliminary estimate of central tendencies and standard deviations of SWE for the Mediterranean Sea, as well as an estimate of peak-SWE and snowmelt timing. These estimates demonstrate the added value of remote-sensing products to tackle societally relevant questions in the 21st century.