Supplemental Material

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Improving the ESA CCI Daily Soil Moisture Time Series with Physically Based Land Surface Model Datasets Using a Fourier Time-Filtering Method
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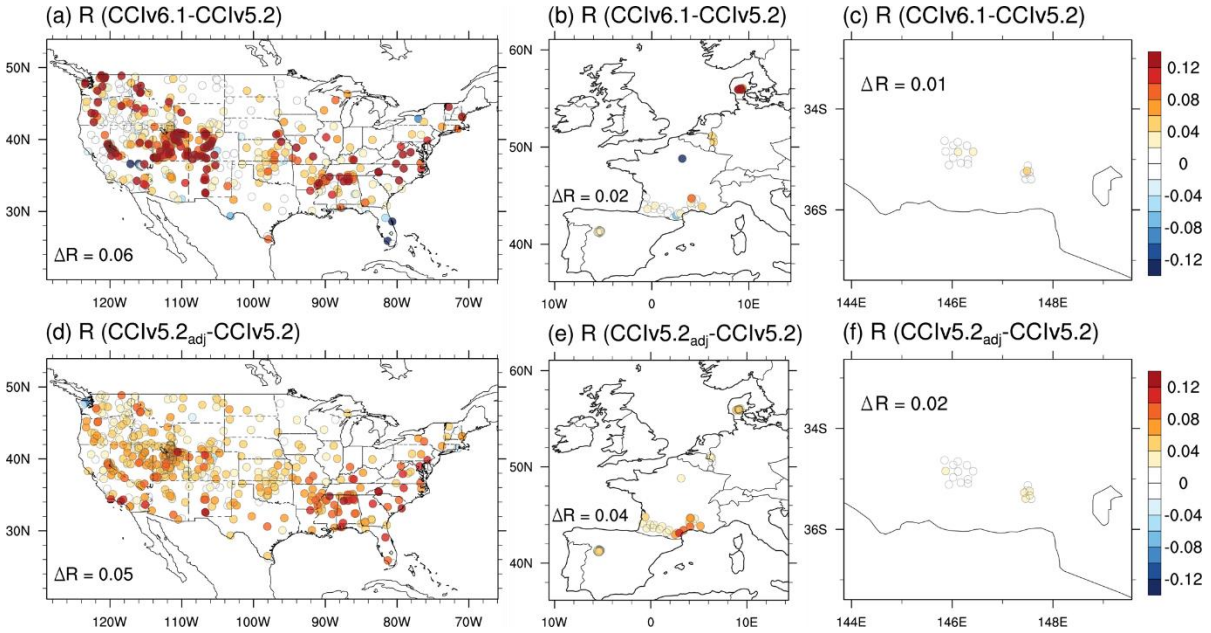
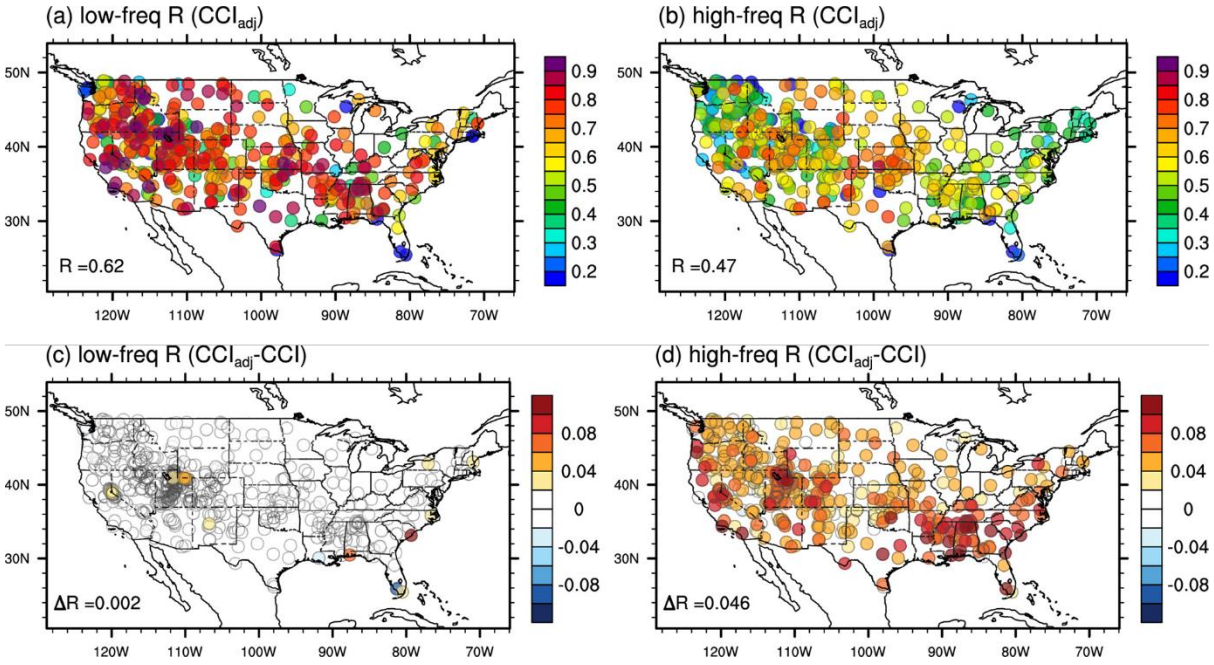
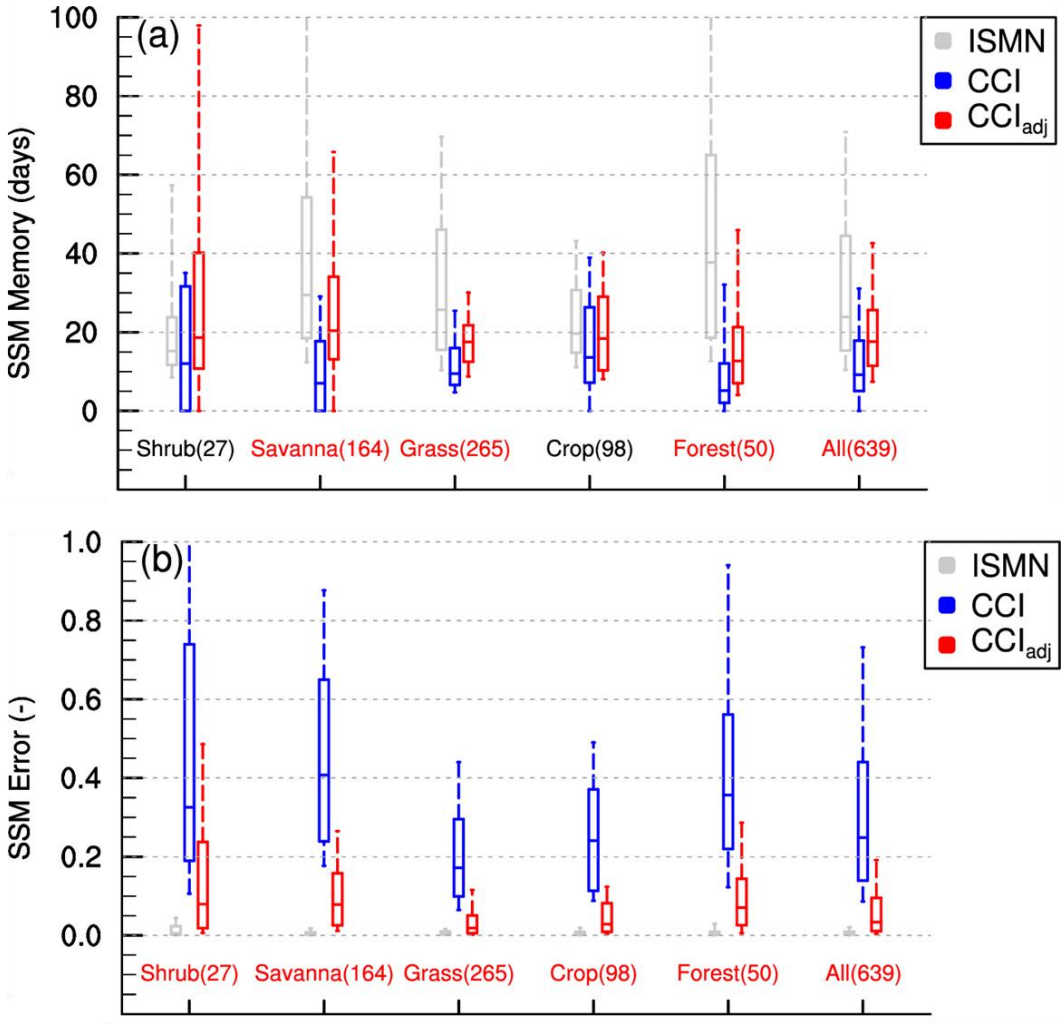


Supplementary Figure 1 Difference map of the surface SM skill measured as the correlation coefficient R between *in situ* measurements and two recent versions of the CCI SM product (cf. Figure 7). The skill difference between CCI v06.1 and v05.2 over (a) U.S. CONUS, (b) Europe and (c) Australia. Panels (d-f) show the skill difference between CCI_{adj} and CCI from v05.2 product. Domain averaged R difference is indicated in the bottom-left corner of each map. For a fair comparison between these two different version datasets, the skill is evaluated for 2000–2019 when they are overlapped.



Supplementary Figure 2 Surface SM skill of (a) low-frequency (30-day running mean) and (b) high-frequency (30-day running mean removed) CCI_{adj} time series validated against *in situ* measurements over U.S. CONUS. Panels (c, d) show the skill difference between CCI_{adj} and CCI. Domain averaged R and its difference (CCI_{adj} minus CCI) are indicated in the bottom-left corner of each map.



Supplementary Figure 3 as in Figure 11, but for CCI v05.2. Because of data availability, the evaluated period is limited to 2000–2019, which also affects the number of available *in situ* measurements.