

*[Water Resources Research]*

Supporting Information for

**[Downscaling SMAP Radiometer Soil Moisture over the CONUS Using an Ensemble Learning Method]**

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Text S1.

This figure illustrates the soil texture of top 5 cm soil layer over the CONUS. CONUS-SOIL is available in both gridded and vector formats, and can be retrieved via <http://www.soilinfo.psu.edu/>.

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Figure S1. Soil texture of top 5 cm soil layer over the CONUS

Text S2.

GTOPO30 is a global Digital Elevation Model (DEM) developed by the U.S. Geological Survey’s (USGS) EROS Data Center in late 1996. This data set has a 30 arc-seconds (approximately 1 km) resolution. Figure S2 (in supplement file) shows the DEM with colors representing the variation of elevation from 0 to 4587 meters above sea level. More information along with the data set can be found at <https://lta.cr.usgs.gov/GTOPO30>.



Figure S2. The USCRN and SCAN soil moisture sensors throughout the CONUS and Digital Elevation Map (DEM) showing the variations of elevation.

Text S3.

This figure depicts three stations located in different geographical zones and their adjacent environment.



Figure S3. SCAN stations located at (a) Tift, Georgia (b) Whitman, Washington and (c) Fresno, California (<https://www.wcc.nrcs.usda.gov/scan/>).