

Estimation of Permafrost SOC Stock (SOCS) and Turnover Time (STT) Using a Land Surface Model with Vertical Heterogeneity of Permafrost Soils

This folder contains following two NetCDF datasets:

1. ISAM_SOCS_STT.nc

This file contains spatial distribution of decadal mean 1.0 meter SOCS (unit: kgC m⁻²) and STT (unit: year) from ISAM-0D and ISAM-1D simulations for 1) 1860s and 2) 2000s. The results for ISAM-1D also provided for the topsoil (0-30cm) and subsoil (30-100cm). The file includes following variables:

socs0d_preind: ISAM-0D simulated 1m SOCS for the 1860s
socs0d_contemp: ISAM-0D simulated 1m SOCS for the 2000s
socs1d_preind: ISAM-1D simulated 1m SOCS for the 1860s
socs1d_contemp: ISAM-1D simulated 1m SOCS for the 2000s
socs1d_topsoil_preind: ISAM-1D simulated topsoil SOCS for the 1860s
socs1d_topsoil_contemp: ISAM-1D simulated topsoil SOCS for the 2000s
socs1d_subsoil_preind: ISAM-1D simulated subsoil SOCS for the 1860s
socs1d_subsoil_contemp: ISAM-1D simulated subsoil SOCS for the 2000s
stt0d_preind: ISAM-0D simulated 1m STT for the 1860s
stt0d_contemp: ISAM-0D simulated 1m STT for the 2000s
stt1d_preind: ISAM-1D simulated 1m STT for the 1860s
stt1d_contemp: ISAM-1D simulated 1m STT for the 2000s
stt1d_topsoil_preind: ISAM-1D simulated topsoil STT for the 1860s
stt1d_topsoil_contemp: ISAM-1D simulated topsoil STT for the 2000s
stt1d_subsoil_preind: ISAM-1D simulated subsoil STT for the 1860s
stt1d_subsoil_contemp: ISAM-1D simulated subsoil STT for the 2000s

2. ISAM_CLIM_CO2_SOCS.nc

This file contains the spatial distribution of the changes of 1.0 meter SOCS from the 1860s to 2000s due to 1) CO2 fertilization effect, 2) Climate change effect and 3) combined effects simulated using ISAM-0D and ISAM-1D models. The results for ISAM-1D also provided for the topsoil (0-30cm) and subsoil (30-100cm). The file includes the following variables:

dsocs0d: ISAM-0D simulated changes in 1m SOCS by considering both effects
dsocs1d: ISAM-1D simulated changes in 1m SOCS by considering both effects
dsocs1d_topsoil: ISAM-1D simulated changes in topsoil SOCS by considering both effects
dsocs1d_subsoil: ISAM-1D simulated changes in subsoil SOCS by considering both effects
dsocs0d_co2: ISAM-0D simulated changes in 1m SOCS by considering CO2 fertilization effect only

dsocsl1d_co2: ISAM-1D simulated changes in 1m SOCS by considering CO2 fertilization effect only
dsocsl1d_topsoil_co2: ISAM-1D simulated changes in topsoil SOCS by considering CO2 fertilization effect only
dsocsl1d_subsoil_co2: ISAM-1D simulated changes in subsoil SOCS by considering CO2 fertilization effect only
dsocsl0d_clim: ISAM-0D simulated changes in 1m SOCS by considering Climate change effect only
dsocsl1d_clim: ISAM-1D simulated changes in 1m SOCS by considering Climate change effect only
dsocsl1d_topsoil_clim: ISAM-1D simulated changes in topsoil SOCS by considering Climate change effect only
dsocsl1d_subsoil_clim: ISAM-1D simulated changes in subsoil SOCS by considering Climate change effect only

Users can use these data to reproduce the figures 5-9 appear in the main text.