Global estimates of drought stress in soils using SMAP

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Data description:

This resource provides the global estimates of Flash Drought Stress Index (FDSI) from 31st Match 2015 through 19th March 2019 at a daily time-step at 36-km spatial resolution. FDSI non-linearly combines Soil Moisture Stress (SMS, drought stress) and the Relative Rate of Drydown (RRD, drought stress intensification rate). SMS and RRD are developed using SMAP θ_{RS} (March 2015-2019) and footprint-scale seasonal soil water retention parameters and land-atmospheric coupling strength. The value of FDSI ranges between (0, 1) with values >0.71 indicates flash drought conditions. For details, the readers are referred to Sehgal. et. al. 2021.

Variable summary:

File names	Description	Unit
FDSI.nc	FDSI estimates from 31st March 2015- 19th March 2019	[-]
	Variable names = fdsi, Latitude, Longitude, Time	
thetaTD_DOY.nc	θ^{TD}: transition point between transitional and dry phase for each calendar day.	m^3/m^3
	Variable names = thetaTD, Latitude, Longitude, Time	
thetaWT_DOY.nc	θ^{WT}: transition point between wet and transitional phase for each calendar day	m^3/m^3
	Variable names = thetaWT, Latitude, Longitude, Time	
m2_DOY.nc	m_2: slope of gravity drainage phase for each calendar day	day^{-1}
	Variable names = m2, Latitude, Longitude, Time	

References:

1. Sehgal, V., Gaur, N., & Mohanty, B. P. (2020) "Global Surface Soil Moisture Drydown Patterns." *Water Resources Research*: 57 (1). doi: 10.1029/2020WR027588.
2. Sehgal, V., Gaur, N., & Mohanty, B. P. (2021)" Global Flash Drought Monitoring using Surface Soil Moisture." (*Under review*) Preprint available at: Earth and Space Science Open Archive.

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# R code for data extraction
library(raster)
library(ncdf4)

# Extract RasterBrick from NetCDF file
fdsi_brk=brick("~/FDSI.nc")

# Extract 3-D matrix (Long, Lat, Time)
loc="FDSI.nc"
nc = nc_open(loc)
time=ncdf4::ncvar_get(nc,'Time')
Latitude=ncdf4::ncvar_get(nc,'Latitude')
Longitude=ncdf4::ncvar_get(nc,'Longitude')
FDSI=ncdf4::ncvar_get(nc,'fdsi')
```

For questions regarding data extraction and visualization, contact Vinit Sehgal or refer to https://rpubs.com/Vinit_Sehgal/lgar