These gridded surface cloud fraction radiative kernels (GCF-CRKs) are created by integrating refined downwelling surface shortwave radiation (DSSR) estimates and a high-precision cloud fraction (CF). The DSSR is corrected by a CF-dependent model, which leveraging the correlation between the top-of-atmosphere (TOA) shortwave radiative parameters and surface radiation, combined with high-precision fused CF datasets from multiple satellite sources.

There are five individual files. “SFC\_SW\_Kernel\_Arc.nc” is for CRKs of all clouds, “SFC\_SW\_lowcloud\_Kernel\_Arc.nc” is for CRKs of low-level clouds, “SFC\_SW\_midlowcloud\_Kernel\_Arc.nc” is for CRKs of mid-low-level clouds, “SFC\_SW\_midhighcloud\_Kernel\_Arc.nc” is for CRKs of mid-high-level clouds, and “SFC\_SW\_highcloud\_Kernel\_Arc.nc” is for CRKs of high-level clouds. The four cloud layers are derived from four pressure layers (surface to 700 hPa, 700-500 hPa, 500-300 hPa, and 300-50 hPa, representing low, middle-low, middle-high, and high clouds, respectively) based on the CERES-SYN stratification standard.

The file format is netcdf4, and was created by Matlab. To read these files, any software supporting netcdf4 can be used. These files only involved sunlit months from Apr to Sep during 2000-2020, with the longitude from -180°~180° and the latitude from 60°N~90°N.