PMIP4 HadGEM2-A dust data

The simulation of the pre-industrial and LGM climate states with HadGEM2-A are described in more detail by Hopcroft & Valdes (2015), whilst the dust results are described by Hopcroft et al (2015). The dust scheme itself has been documented by Woodward (2011). HadGEM2-ES is documented by Collins et al (2011).

Data files

- files names = `PMIP4_DUST_Hopcroft_<field>_<expt>.nc`
  - `field` = see Variables section below
  - `expt` = `PI` or `LGM`

Dimensions

- nb_time = 12 (12 monthly time steps in each file)
- nb_lat, nb_lon = 145, 192
  - latitude_values = [-90, -88.75, -87.5, ... 87.5, 88.75, 90]
  - longitude_values = [0, 1.875, 3.75, ... 354.375, 356.25, 358.125]
- size_bin = 6
  - dust size bin edges = 0.0316, 0.1, 0.316, 1.0, 3.16, 10.0 and 31.6 µm
- nb_wavelength = 6
  - AOD is given on 6 wavelengths. These are 0.38, 0.44, 0.55, 0.67, 0.87 and 1.02 µm (Bellouin et al 2007).
- nb_levels = 38
  - check the `PMIP4_DUST_Hopcroft_conc_<expt>.nc` files for details about the hybrid coordinates

Variables

2D dust fields

- **emis**: emission (lon,lat,size,month) [g/m2/a]
- **ddep**: dry deposition (lon,lat,size,month) [g/m2/a]
- **wdep**: wet deposition (lon,lat,size,month) [g/m2/a]
- **load**: dust loading (lon,lat,size,month) [kg/m2]
- **aot**: aerosol optical thickness (lon,lat,wavelength,month) [unitless]
- **rfss**: surface short-wave radiative forcing (lon,lat,month) [W/m2]
- **rfsl**: surface long-wave radiative forcing (lon,lat,month) [W/m2]
- **rfts**: TOA short-wave radiative forcing (lon,lat,month) [W/m2]
- **rftl**: TOA long-wave radiative forcing (lon,lat,month) [W/m2]

3D dust fields

- **conc**: mass mixing ratio (lon,lat,lev,month) [kg/kg] x 6 bins

References

- Bellouin, N et al., (2007), **Improved representation of aerosols for HadGEM2**, Hadley Centre Technical Note 73, Met Office Hadley Centre, Exeter, UK:
- Collins, WJ et al (2011), **Development and evaluation of an Earth-System model – HadGEM2**, Geoscientific Model Development, 4, 1051-1075, doi:10.5194/gmd-4-1051-2011.
- Hopcroft, P.O. and P.J. Valdes (2014), **Last Glacial Maximum constraints on the Earth System Model HadGEM2-ES**, Climate Dynamics, 45(5), 1657-1672, doi:10.1007/s00382-014-2421-0.
- Hopcroft, P.O., P.J. Valdes, S. Woodward and M. Joshi (2015), **Last glacial maximum radiative forcing from mineral dust aerosols in an Earth System model**, J Geophysical Research, 120(16), 8186-8205, doi:10.1002/2015JD023742.
- Woodward, S. (2011), **Mineral dust in HadGEM2**, Hadley Centre Technical Note 87, Met Office Hadley Centre, Exeter, UK.

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