so2-at-height: percent difference surface flux surface flux surface concentration surface concentration of BC - SH-land of SO2 - SH-land of BC - SH-land of SO4 - SH-land of SO2 - SH-land 0e+00 5e-05 2e-01 0e+00 -2e+00 0e+00 -5e-05 5.0e+00 _2e_01 -6e+01 -1e-04 0.00+00 _6e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year upwelling longwave flux at TOA – SH–land upwelling shortwave flux at TOA – SH–land upwelling clear-sky longwa flux at TOA - SH-land net radiative flux incident shortwave flux at TOA - SH-land at TOA - SH-land 1e-01 5.0e-02 1e-01 rsut 0e+00 ∆ rsut rlut + 1 5e-02 2.5e-02 _1__07 0e+00 0.0e+00 -2e-07 0.0e+00 -1e-01 -5e-02 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year dry deposition rate of BC – SH–land upwelling clear–sky shortway flux at TOA – SH–land wet deposition rate of BC – SH–land clear-sky net radiative implied cloud response flux at TOA - SH-land at TOA - SH-land rsutcs) 5e-01 2e-01 2e-01 rlutcs -1e-01 ∆ wetbc 1e-01 ∆ rsutcs 1e-01 ∆ rlutcs + 0e+00 0e+00 rsut – 0e+00 00+00 -1e-01 -1e-01 -1e-01 -5e-01 -2e-0 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 Year total deposition rate of BC – SH–land dry deposition rate of SO2 – SH-land dry deposition rate of SO4 – SH-land wet deposition rate of SO4 – SH-land wet deposition rate of SO2 - SH-land 1e+00 1.5e+01 -2e+01 2.0e+01 wetso4 1.0e+01 0e+00 1.0e+01 5.0e+00 5.0e+00 -5e-01 -5e+01 5.0e+00 0.0e + 0.0-1e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - SH-lan convective cloud cover - SH-I surface cloud cover - SH-lai of S - SH-land thickness at 550nm - SH-lai 1e+01 0e+00 2.5e-01 ∆ od550ae -2e+01 0.0e+00 0e+00 -1e+01 -2e+01 -3e-01 -6e+01 -3e+01 0.0e+0020002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year ice water path - SH-land surface concentration column mass burden column mass burden column mass burden of DMS - SH-land of BC - SH-land of SO2 - SH-land of SO4 - SH-land 5.0e-01 1.5e+01 1e+00 4e-01 0.0e+00 1.0e+01 2e-01 0e+00 -5.0e-01 1.0e+01 0e+00 5.0e+00 -1.0e+00-1e+00-2e-01 5.0e+00 0.0e+00 -4e-01 -1.5e+002000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year CAM5 E3SM **GISS** OsloCTM3 CESM1 **GEOS** MIROC **UKESM** CESM2 GFDL NorESM2