land: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - so2-at-height of SO2 - so2-at-height of BC - so2-at-height of SO4 - so2-at-height of SO2 - so2-at-height 4e-05 30+01 4e+00 0e+00 -3e+01 3e+00 ∆ emibc 2e+01 2e+00 0e+00 -5e+01 1e+00 0e+00 -2e+00 -6e+01 -2e-05 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 – so2–at–height upwelling clear-sky longwa flux at TOA - so2-at-heig net radiative flux upwelling shortwave flux incident shortwave flux at TOA – so2–at–height at TOA - so2-at-height at TOA - so2-at-height 5.0e-02 2.5e-02 1e-07 3e-01 rlut+ 0.0e+00 26\_01 26-01 -2 5e-02 1e-01 -2 5e-02 -1e-07 -5.0e-02 0e+00 2000 2001 2002 2003 2004 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling clear–sky shortwave flux at TOA – so2–at–height clear-sky net radiative flux at TOA - so2-at-heigh implied cloud response dry deposition rate wet deposition rate at TOA - so2-at-height of BC - so2-at-height of BC - so2-at-height rsutcs) 0e+00 9e-01 rlutcs -7.5e-01 6e--01 5.0e-01 rsut--4e-01 0.00+00 -6e-01 0e+00 0.0e+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 dry deposition rate of SO2 – so2–at–height wet deposition rate of SO2 – so2–at–height dry deposition rate of SO4 – so2–at–height wet deposition rate of SO4 – so2–at–height total deposition rate of BC - so2-at-height 3e+01 -3e+010.0e+00 3e+01 ∆ wetso4 2e+01 -2.5e-01 1e+01 -5.0e-01 \_5e+01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2002 2003 2004 Year Year Year  $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ Year Year total deposition rate ambient aerosol optical total cloud cover - so2-at-hei convective cloud cover - so2-atsurface cloud cover - so2-at-h of S - so2-at-height thickness at 550nm - so2-at-l 2e-01 0.0e+001e-01 ∆ od550ae <u>\</u> 1.0e+36 2.5e+01 -2.5e+01-1e-01 -5e-01 0.0e+00 -5.0e+01 -2e-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 - so2-at-heig surface concentration column mass burden column mass burden column mass burden - so2-at-height of BC - so2-at-height of SO2 - so2-at-height of SO4 - so2-at-height 3e-01 1.5e+00 4e+01 3e+01 0e+00 1.0e+00 ∆ clivi -3e-01 2e+01 0.0e+0.01e+01 -6e-01 -3e-01 1e+01 0e+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 CAM5 E3SM **GISS** OsloCTM3 CESM1 **GEOS** MIROC **UKESM** CESM2 GFDL NorESM2