global: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - no-so4 of SO2 - no-so4 of BC - no-so4 of SO4 - no-so4 of SO2 - no-so4 4e-05 5.0e-01 -4e+00 2e+00 2.8e+00 2.5e-0° Δ emibc ∆ mmrbc 2.4e+00 0.00+00 0e+001e+00 2.0e+00 -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 – no-so4 upwelling shortwave flux at TOA – no–so4 upwelling clear-sky longwav flux at TOA - no-so4 net radiative flux incident shortwave flux at TOA - no-so4 at TOA - no-so4 3e-08 3e-02 rsut 2e-01 2e-01 Δ rsut 2e-02 ∆ rlut + 0e+00 1e-02 0e+00 0e+00 0e+00 00+00 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 Year Year Year Year Year upwelling clear–sky shortwave flux at TOA – no–so4 clear-sky net radiative flux at TOA - no-so4 dry deposition rate of BC – no–so4 implied cloud response wet deposition rate at TOA - no-so4 of BC - no-so4 rsutcs) 3e-01 56-01 rlutcs -0e+00 ∆ wetbc 2e-01 00+00 0e+00 -5e-02 rsut – 1e 1e-01 -5e-0 -2e-01 -1e-01 0e+00 00+00 r Tinti -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 dry deposition rate of SO4 – no–so4 total deposition rate of BC – no–so4 dry deposition rate of SO2 – no–so4 wet deposition rate of SO4 – no-so4 wet deposition rate of SO2 - no-so4 2.5e+00 -5.0e-01 4e-01 ∆ drybc + wetbc -2.5e+00 2.0e+00 wetso2 0e+00 2.0e+00 -1.5e+00 -4e-01 1.8e+00 -2.0e+005.0e-01 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 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ convective cloud cover - no-s total deposition rate ambient aerosol optical total cloud cover - no-so4 surface cloud cover - no-so of S - no-so4 thickness at 550nm - no-so 0e+000e+00 -2e+01 ∆ od550aer 0e+00 -2e+00 등 -1e-01 <u>\</u> -4e+00-4e-01 -6e+00 -6e-01 2000 2001 2002 2003 2004 2002 2003 2004 20002001200220032004 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year ice water path - no-so4 surface concentration column mass burden column mass burden column mass burden of DMS - no-so4 of BC - no-so4 of SO2 - no-so4 of SO4 - no-so4 5e-01 0e+00 7.5e+00 0e+00 4e+00oadso2 ∆ clivi ∆ loadbc 0e+00 5.0e+00 2.5e+00 -5e-01 2e+00 0.0e+00 -6e-01 -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 CAM5 E3SM **GISS** OsloCTM3 CESM1 **GEOS** MIROC **UKESM** CESM2 GFDL NorESM2