high-so4: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - land of SO2 - land of BC - land of SO4 - land of SO2 - land 2.5e+01 00+00 2e-05 -1e+00 2.0e+01 0e+00 mmrs04 ∆ emibc _2e+00 -4.8e+00 -2e-05 -3e+00 1.5e+01 26-01 -4e-05 -4e+00 -6e-05 -5.2e+00 -5e+00 0e+00 1.0e+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 upwelling longwave flux at TOA – land upwelling shortwave flux at TOA – land upwelling clear-sky longwa flux at TOA - land net radiative flux incident shortwave flux at TOA - land at TOA - land 1e-01 5e-08 5.0e-02 Зе _01 3e-01 0e+00 rsut 2.5e-02 2e-01 0.0e+00 1e-0 -5e-08 -5e-020e+00 0e+00 -1e-01 2002 2003 2004 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year upwelling clear-sky shortwave flux at TOA - land clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - land at TOA - land of BC - land of BC - land rsutcs) 3e-01 rsutcs 5e-01 rlutcs -4e-01 √ 2e-01 0e+00 1e-01 ∆ rlutcs rsut – 0e+00 2e-01 -5e-01 -1e+00 _1e+00 0e+00 0e+002002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year dry deposition rate of SO2 – land total deposition rate dry deposition rate wet deposition rate wet deposition rate of BC - land of SO2 - land of SO4 - land of SO4 - land 6e-01 -4.8e+00 6e+00 ∆ drybc + wetbc 3e-01 -4.9e+005e+00 dryso4 -4 0e+00 4e+00 0e+00 2e+01 _5 1e+00 -3e-01 1e+01 2e+00 -5.2e+00 -5.5e+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 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ Year total deposition rate ambient aerosol optical total cloud cover - land convective cloud cover - lan surface cloud cover - land of S - land thickness at 550nm - land 2e-01 0e+00 3e+01 2.5e-01 1e+00 ∆ od550ae ا کا کا 2e+01 -2e-01 -4e+011e+01 -2.5e-01 -4e-01-6e+01 20002001200220032004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year ice water path - land surface concentration column mass burden column mass burden column mass burden of DMS - land of BC - land of SO2 - land of SO4 - land 4e-01 2e-01 -3e+007.5e-01 2e+00 loadso2 dms 0e+00 5.0e-01 -4e+00 1e+00 2.5e 5e+00 -2e-010e+00 -5e+00 0.0e+00 -4e-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 CAM5 E3SM **GISS** OsloCTM3

CESM1

CESM2

GEOS

GFDL

MIROC

NorESM2

UKESM