so2-at-height: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - SH-sea of SO2 - SH-sea of BC - SH-sea of SO4 - SH-sea of SO2 - SH-sea 8e-01 8e+00 36-05 2e+00 0.0e+00 2e-05 4e-01 mmrso4 ∆ mmrbc 1e+00 1e-05 4e+00 0e+00 0e+00 0e+00 2e+00 -1e-05 -1.5e+01 -2e-05 2002 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 Year upwelling longwave flux at TOA – SH–sea upwelling shortwave flux at TOA – SH-sea incident shortwave flux at TOA – SH–sea upwelling clear-sky longwav flux at TOA - SH-sea net radiative flux at TOA - SH-sea 8e-02 1e-07 5e-08 rsut ∆ rlutcs ∆ rlut ∆ rlut + i 1e-01 1e-01 0e+00 0e+00 0e+00 _5e_08 -1e-02 -1e-07 2001 2002 2003 2004 2002 2003 2004 2000 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling clear-sky shortwave flux at TOA - SH-sea wet deposition rate of BC – SH–sea clear-sky net radiative implied cloud response dry deposition rate flux at TOA - SH-sea at TOA - SH-sea of BC - SH-sea rsutcs) 1e+00 4e-01 2e-01 3e-01 3e-01 rlutcs -1e-01 ∆ wetbc 2e-01 2e-0 rsut – 1e-01 0e+00 0e+00 _Oʻ 0e+00 _5e_01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 wet deposition rate of SO2 – SH-sea dry deposition rate of SO4 – SH–sea total deposition rate of BC – SH–sea wet deposition rate of SO4 – SH-sea dry deposition rate of SO2 - SH-sea 8e+00 1e+00 ∆ drybc + wetbc 6e+00 7.5e+00 6e+00 5e-01 wetso2 wetso4 5.0e+00 0e+00 -2e+00-5e-01 2.5e+00 4e+00 -1e+00 0.0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 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 - SH-sea convective cloud cover - SH-s surface cloud cover - SH-se of S - SH-sea thickness at 550nm - SH-se 1e-01 0e+00 0e+00 -2e+01 2e+01 양 -1e-01 -4e+01 -2e-01 2e+35 1e+01 _6e+01 -3e-01 _01 0e+00 20002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year ice water path - SH-sea column mass burden column mass burden column mass burden surface concentration of DMS - SH-sea of BC - SH-sea of SO2 - SH-sea of SO4 - SH-sea 5e-01 1.2e+01 1.0e+0.11e+01 oadso4 ∆ dms 0e+00 5e+00 5.0e -5e-01 0.0e+00 -5e-01 2.5e+00 0e+00 -1e+00 -1e+00 0.0e+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