sea: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - high-so4 of SO2 - high-so4 of BC - high-so4 of SO4 - high-so4 of SO2 - high-so4 5.0e=06 8e-01 -2.0e+00 00+00 6e+00 -1e+00 0.0e+00 4e-01 ∆ mmrbc 5e+00 _2e+00 -5.0e-06 4e+00 -3e+00 0e+00-1.0e-05 -4e+00 3e+00 -1.5e-05 -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 upwelling longwave flux at TOA – high–so4 upwelling shortwave flux at TOA – high–so4 net radiative flux at TOA – high–so4 incident shortwave flux at TOA – high–so4 upwelling clear–sky longwav flux at TOA – high–so4 4e-08 4e-01 3e-02 0.0e + 00_01 2e-08 3e-01 2e-02 2e-01 -2.5e-02 1e-02 0e+001e-01 00+00 -5.0e-02 -2e-08 0e+00 -1e-02 2000 2001 2002 2003 2004 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 Year Year Year Year clear-sky net radiative flux at TOA - high-so4 dry deposition rate of BC – high–so4 wet deposition rate of BC – high–so4 upwelling clear-sky shortwave implied cloud response flux at TOA - high-so4 at TOA - high-so4 rsutcs) 3e-01 1e+00 36_01 rlutcs -2e-01 2e-01 1e-01 2.5e ∆ rlutcs rsut – 1e-01 1e-01 -1e+00 0.0e+00 r Tinti 00+00 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 wet deposition rate of SO4 – high–so4 dry deposition rate of SO4 – high–so4 total deposition rate of BC – high–so4 wet deposition rate of SO2 – high-so4 dry deposition rate of SO2 - high-so4 2e+00 -2.0e+00 6e+00 ∆ drybc + wetbc 1e+00 -2e+00 ∆ wetso2 wetso4 2e+00 0e+00 -1e+00 -2e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 Year Year Yea Year $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ Year total deposition rate ambient aerosol optical total cloud cover - high-soconvective cloud cover - highsurface cloud cover - high-s of S - high-so4 thickness at 550nm - high-s 1e+00 2e-01 1.0e-01 5e-01 4e+00 -2e+01 2e+00 ㅎ 0e+00 ا کا کا 0e+00 -4e+010.0e+00 0e+00 -1e-01 -5e-01 -6e+01 -5.0e-02 -2e+00 -1e+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 - high-so4 column mass burden column mass burden column mass burden surface concentration of DMS - high-so4 of BC - high-so4 of SO2 - high-so4 of SO4 - high-so4 1.0e+00 5.0e-01 1.5e+0.11.5e+00 ∆ loadso2 0e+00 2.5e-0 1.0e+00 5.0e-01 5.0e+00 0.0e+00 -2e+00 0.0e+00 0.0e+00-2.5e-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 **GEOS** MIROC **UKESM** CESM2 **GFDL** NorESM2