NH-atlantic: absolute difference surface flux of SO2 – no–so4 surface flux of BC – no-so4 surface concentration surface concentration of SO4 – no–so4 surface concentration of SO2 – no–so4 2.6e-20 $\rm emiso2~(kg~m^{-2}~s^{-1})$ $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ mmrso4 (kg kg – 1) mmrbc (kg kg – 1) so2 (kg kg-1) 4.3e-21 5.0e-14 -6.3e-21 2002 2003 2002 2003 2001 2002 2003 2002 2003 2001 2001 2002 2003 2001 2001 Year Year Year Year Year upwelling longwave flux at TOA – no-so4 upwelling shortwave flux at TOA – no–so4 upwelling clear–sky longwa flux at TOA – no–so4 net radiative flux incident shortwave flux at TOA - no-so4 at TOA - no-so4 5.0e-02 2e-01 2e-01 2.5e-02 rlut + rsut $(W m^{-2})$ 1e-01 2e-07 rlutcs (W m-2) rlut (Wm-2)rsut(Wm-2)rsdt(Wm-2)2e-01 1e-01 0.0e+00 1e-01 0e+00 0e+00 0e+00 -1e-01 -1e-01 2001 2003 2002 2003 2003 2004 2001 2002 2003 2002 2003 2001 2002 2001 2001 2002 Year Year Year Year dry deposition rate of BC – no–so4 wet deposition rate of BC – no–so4 upwelling clear-sky shortwav clear-sky net radiative implied cloud response flux at TOA - no-so4 flux at TOA - no-so4 at TOA - no-so4 + rsut - rlutcs - rsutcs (W 2e-01 5.0e-02 lutcs + rsutcs (W m $^{-2}$) wetbc $(kg m^{-2} s^{-1})$ 2.5e-15 rsutcs (W m-2) drybc $(kg m^{-2} s^{-1}$ 2.5e-02 1e-01 0.0e+00 0e+00 -2.5e-021e-01 -5e-02-5 0e-02 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 Year Year Year Year Year total deposition rate of BC – no–so4 dry deposition rate of SO2 – no–so4 wet deposition rate of SO2 – no-so4 dry deposition rate of SO4 – no–so4 wet deposition rate of SO4 – no-so4 1.2e-13 $drybc + wetbc (kg m^{-2} s^{-1})$ 2.2e-15 $dryso2 (kg m^{-2} s^{-1})$ wetso2 $(kg m^{-2} s^{-1})$ $dryso4 (kg m^{-2} s^{-1})$ wetso4 (kg m⁻² s⁻¹) -5.0e-14 1.0e-13 4.1e-16 5.0e-14 0e+00 -3.3e-15 2003 2002 2003 2002 2003 2002 2003 2002 2003 Year Year Year Year total deposition rate ambient aerosol optical total cloud cover convective cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3of S - no-so4 thickness at 550nm percentage - no-so4 percentage - no-so4 0e+00 1e-01 expression(clt~(%) $(kg m^{-2} s^{-1})$ od550aeı 0e+00 -1e-01 2001 2002 2003 2004 2002 2003 2002 2002 2003 Year Year Year Year **UKESM** CESM1 GISS MIROC **GFDL** E3SM CESM2 NorESM2 OsloCTM3 **GEOS**