bc-no-season: absolute difference surface flux of SO2 – bc–no–season surface concentration of BC – bc–no–season surface flux of BC – bc–no–season surface concentration of SO4 – bc–no–season surface concentration of SO2 – bc–no–season 0.0e+00 2e-01 2e-02 1.5e+00 0e+00 emibc (kg m-2 s-1) emibc (kg m-2 s-1) kg-1) mmrbc (kg kg-1) so2 (kg kg-1) 1e-02 1.0e+00 0e+00 mmrso4 (kg -5.0e+01 0e+00 -7 5e+01 -1e+01 -1e-02 0.0e+00 2001 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 Year Year Year Year Year upwelling shortwave flux at TOA – bc–no–season upwelling longwave flux at TOA – bc-no-season incident shortwave flux at TOA – bc-no-season upwelling clear-sky longwav flux at TOA - bc-no-seaso net radiative flux at TOA - bc-no-season 6e-02 4e-02 5e-02 rlut + rsut (W m-2) ·lutcs (W m-2) rlut (W m-2) sut (W m-2) rsdt (W m-2) 0e+00 1e-08 2e-02 0e+00 0e+00 -5e-02 0e+00 -1e-01 -2e-02 2003 2003 2003 2003 2003 2001 2002 2004 2001 2002 2004 2001 2002 2004 2001 2002 2001 2002 Year Year Year Year Year upwelling clear-sky shortwave clear-sky net radiative dry deposition rate wet deposition rate total deposition rate flux at TOA - bc-no-seasor flux at TOA - bc-no-season of BC - bc-no-season of BC - bc-no-season of BC - bc-no-season drybc + wetbc (kg m-2 s-1) m-2drybc (kg m-2 s-1) 1e-01 1e-01 wetbc (kg m-2 s-1 0e+00 rsutcs (W m-2) rlutes + rsutes (W ·1e+01 -5e+00 5e-02 -1e+01 -2e+01 -1e+01 0e+00 0e+00 2001 2002 2003 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 Year Year Year Year Year (dryso4 + wetso4)/3 (kg m-2 s-1) dry deposition rate of SO2 – bc–no–season wet deposition rate of SO4 – bc–no–season wet deposition rate dry deposition rate total deposition rate of SO2 - bc-no-season of SO4 - bc-no-season of S - bc-no-season 5e-01 0e+00 2e-01 dryso2 (kg m-2 s-1) 1e+00 wetso2 (kg m-2 s-1) dryso4 (kg m-2 s-1) wetso4 (kg m-2 s-1) 2e-01 0e+00 0e+00 0e+00 -2e-01 -2e-01 -5e-01 (dryso2 + wetso2)/2 + -1e+00 0e+00 -4e-01 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2002 2003 Year Year Year Year Year ambient aerosol optical total cloud cover convective cloud cover thickness at 550nm - bc-no-se percentage - bc-no-seaso percentage - bc-no-season 0e+00 5.0e-02 -2e+011e-01 0.0e+00 -4e+01 -5.0e-02 0e+00 -6e+01 -1.0e-01 -1e-0 2002 2003 2002 2003 2002 2003 Year Year Year **UKESM** CESM₁ GISS MIROC **GFDI**

E3SM

CESM2

NorESM2

OsloCTM3

GEOS