Reference - absolute land averages surface concentration of BC – land surface concentration of SO4 – land surface concentration of SO2 – land surface flux of BC - land surface flux of SO2 - land 2.4e-11 4.0e-09 emibc (kg m-2 s-1) emiso2 (kg m-2 s-1 1.6e-12 mmrbc (kg kg-1) 3.5e-09 so2 (kg kg-' mmrso4 (kg 3.0e-09 2.5e-09 2.5e-10 2.0e-09 1.5e-09 2 0e-10 2002 2001 2003 2001 2002 2003 2001 2003 2001 2002 2003 2001 2003 Year Year Year Year Year upwelling longwave flux at TOA – land upwelling shortwave flux at TOA – land incident shortwave flux at TOA – land upwelling clear-sky longwave flux at TOA - land net radiative flux at TOA - land 360 236 258 355 327.0 rlut + rsut (W m-2) 256 120 rlutcs (W m-2) sut (W m-2) rsdt (W m-2) rlut (W m-2) 232 326.5 254 326.0 228 252 325.5 340 2001 2003 2001 2003 2001 2003 2001 2003 2001 2003 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 - land flux at TOA - land of BC - land of BC - land of BC - land 5e-13 drybc + wetbc (kg m-2 s-1) rlutcs + rsutcs (W m-2) 80 drybc (kg m-2 s-1) wetbc (kg m-2 s-1) rsutcs (W m-2) 2e-13 325 8.0e-13 320 68 2001 2003 2001 2003 2001 2003 2001 2002 2003 2002 2003 Year Year Year Year Year wetso4)/3 (kg m-2 s-1) dry deposition rate wet deposition rate dry deposition rate wet deposition rate total deposition rate of SO2 - land of SO2 - land of SO4 - land of SO4 - land of S - land dryso2 (kg m-2 s-1) wetso2 (kg m-2 s-1) dryso4 (kg m-2 s-1) (kg m-2 s-1 8e-12 wetso2)/2 + (dryso4 2.0e-12 wetso4 8.0e-12 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 (dryso2 + 1 Year Year Year ambient aerosol optical convective cloud cover total cloud cover thickness at 550nm - land percentage - land percentage - land 60 0.200 15 0.175 56 cltc (%) clt (%) 0.150 52 0.125 2003 2002 2003 2002 2002 2004 2001 2003 2004 2001 2001 2004 Year Year Year OsloCTM3 CFSM1 F3SM **GFDI** MIROC

CESM2

GEOS

GISS

NorESM2

UKESM