Reference – absolute global averages surface flux of BC - globa surface flux of SO2 - globa surface concentration surface concentration of BC - global of SO4 - global of SO2 - global 5.5e-13 5.0e-13 $\mathrm{emibc}\left(\mathrm{kg}\;\mathrm{m}^{-2}\;\mathrm{s}^{-1}\right)$ 1.2e-09 əmiso2 (kg m $^{-2}$ s $^{-1}$ mmrbc (kg kg⁻¹) 4.5e-13 mmrso4 (kg kg⁻ $so2 (kg kg^{-1})$ 4.0e-13 8.0e-10 3.5e-13 3.0e-13 2002 2003 2004 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year longwave flux at TOA - glob clear-sky longwave flux at TOA - global shortwave flux at TOA - globa net radiative flux at TOA - glob incident shortwave flux at TOA – global -100 -237.5 rlut + rsut $(W m^{-2})$ -340 rlut $(W m^{-2})$ 200 rsut (W m⁻² rlutcs (W m^{-2}) $rsdt (W m^{-2})$ -262 -240.0 -104 100 -264 -106 -242.5 0 _350 -108 _268 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2001 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 Year clear-sky shortwave flux at TOA - global clear-sky net radiative flux at TOA – global implied cloud response at TOA – global dry deposition rate of BC – global wet deposition rate of BC – global rsut - rlutcs - rsutcs (W m⁻²) 2.0e-13 lutcs + rsutcs $(W m^{-2})$ wetbc (kg $\mathrm{m}^{-2} \mathrm{s}^{-1}$) rsutcs $(W m^{-2})$ drybc (kg m⁻² s⁻ 1.5e-13 4e-13 -52 -35 -320 ij 2000 2001 2002 2003 2004 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year dry deposition rate of SO2 – global dry deposition rate of SO4 – global wet deposition rate of SO4 – global total deposition rate of BC – global wet deposition rate of SO2 - global 1.75e-12 $drybc + wetbc (kg m^{-2} s^{-1})$ 5.0e-13 $^{-2} s^{-1}$ wetso2 (kg m^{-2} s⁻¹ dryso4 (kg m^{-2} s⁻¹ dryso2 (kg m⁻² s⁻ 0.02 4.5e-13 1.00e-12 0.01 3.5e-13 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2000 2001 2002 2003 2004 2001 2002 2003 2004 Year Year Year Year total deposition rate of S – global (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3 $(kg m^{-2} s^{-1})$ 0.005 0.000 2000 2001 2002 2003 2004 Year CAM-ATRAS CESM1-1950 **GEOS** GISS-1950 CAM-ATRAS-1950 GEOS-1950 NorESM2 CESM1 E3SM-1950 **GISS** NorESM2-1950