shp-ind-shift-1950: absolute difference surface flux of SO2 – global surface flux of BC – global surface concentration surface concentration of SO4 – global surface concentration of SO2 – global 1.2e-19 7 66-16 mmrso4 (kg kg – 1) emibc $(kg m^{-2} s^{-1})$ $m 3miso2~(kg~m^{-2}~s^{-1})$ nmrbc (kg kg – 1) 6.0e-20 _2 7e_16 so2 (kg kg-1) 0.0e+00 0e+00 -6.0e-20 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – global upwelling shortwave flux at TOA – global upwelling clear-sky longway flux at TOA - global net radiative flux incident shortwave flux at TOA – global at TOA – global 5.0e-02 5.0e-02 $rsut (W m^{-2})$ 1e-02 rlutcs (Wm-2)2 5e-02 rsdt (Wm-2)rsut (Wm-2)2.5e-02 0.0e+00 0.0e+00 0.0e + 00-2 5e-02 -1e-02 -5 0e-02 -5.0e-02 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling clear-sky shortway clear-sky net radiative flux at TOA - global implied cloud response dry deposition rate of BC – global wet deposition rate of BC – global flux at TOA – global rsutcs $(W m^{-2})$ at TOA – global 1 8e-16 rlutcs + rsutcs (W m^{-2}) 1e-02 2e-02 vetbc (kg m⁻² s^{-'} drybc (kg m⁻² s⁻ rsutcs (W m-0e+00 0e+00 rlutcs -0e+00-5e-03 -1e-02 rsut – rlut + 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year total deposition rate of BC – global dry deposition rate of SO2 – global wet deposition rate of SO2 – global dry deposition rate of SO4 – global wet deposition rate of SO4 – global 9.5e-17 9 9e-16 2 1e-15 1 0e-14 $drybc + wetbc (kg m^{-2} s^{-1})$ dryso4 (kg m⁻² s⁻¹) wetso4 $(kg m^{-2} s^{-1}$ $^{-2}$ s⁻¹ 5.5e-17 3e-05 1.5e-17 3.0e-15 2e-05 -2.5e-1 -5.1e-15 1e-05 0e+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 Year Year Year Year dyso2 + wetso2)/2 + (dryso4 + wetso4)/3total deposition rate of S – global cloud cover Ice water path - global Dimethyl sulphide (DMS) mole fractic ambient aerosol optical thickness at 550nm – globa percentage - global 1e-02 1e-04 2e-04 8 clivi (kg m^{-2}) _lom lom) smb $(kg m^{-2} s^{-1})$ 양 0e+00 0e+00 expression -1e-02 -2e-04 0e+0020002001200220032004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year SO4 lifetime SO2 lifetime load load load of so2 of so4 - global – global - global of bc - global global wetso4) (days 1.2e-08 4e-10 oadso2/emiso2 (days) 2e-09 loadso4 (kg m⁻²) loadso2 (kg m⁻²) 9.0e-09 oadbc (kg m⁻²) 2e-10 6.0e-09 0e+00(dryso4 + 0e+00 3.0e-09 -2e-09 0.0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2001 2002 2003 2004 2000 2001 2002 2003 Year Year Year Year Year CAM-ATRAS F3SM GISS modelE CESM1 **GEOS** NorESM2