shp-ind-shift: absolute difference surface flux of SO2 – NH–atlantic surface flux BC – NH–atlantic surface concentration surface concentration of SO4 – NH–atlantic surface concentration of SO2 – NH–atlantic 3.2e-20 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ (kg kg - 1)nmrbc (kg kg-1) emiso2 (kg m⁻² s⁻ 1.8e-20 (kg kg--9.0e-12 3.0e-21 302 -1.2e-20 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 – NH–atlantic upwelling shortwave flux at TOA – NH-atlantic upwelling clear–sky longwa flux at TOA – NH–atlanti net radiative flux incident shortwave flux at TOA – NH-atlantic at TOA - NH-atlantic 2.5e-07 0e+00 5.0e-02 $rlut + rsut (W m^{-2})$ rlutcs (W m-2) rlut (Wm-2)rsut (W m-2) sdt (Wm-2)1e-01 2.5e-02 0.00+00 0.0e+00 0e+00 -1e-01 -3e-01 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year upwelling clear-sky shortway flux at TOA - NH-atlantic clear-sky net radiative flux at TOA - NH-atlantic implied cloud response dry deposition rate of BC – NH-atlantic wet deposition rate of BC - NH-atlantic rsutcs (W rlutcs + rsutcs (W m⁻² 2.5e-02 2e-02 0e+00 1.0e-16 vetbc (kg m⁻² s⁻ drybc (kg m⁻² s⁻ rsutcs (W m-0.0e+0.00e+00 rlutcs --2e-02 -2.5e-02 rsut – -2e-01 -6e-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 total deposition rate of BC - NH-atlantic dry deposition rate of SO2 – NH–atlantic wet deposition rate of SO2 – NH-atlantic dry deposition rate of SO4 – NH–atlantic wet deposition rate of SO4 – NH-atlantic $drybc + wetbc (kg m^{-2} s^{-1})$ wetso2 (kg m^{-2} s⁻¹ dryso4 (kg $\mathrm{m}^{-2} \mathrm{s}^{-1}$ dryso2 (kg m $^{-2}$ s $^{-1}$ 3.5e-16 vetso4 (kg m⁻² -4.2e-16 1e-02 -1.2e-15 0e+002000 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 + (dyso4 + wetso4)/3Ice water path - NH-atlantiDimethyl sulphide (DMS) mole fraction total deposition rate of S – NH–atlantic cloud cover ambient aerosol optical thickness at 550nm – NH-atl percentage - NH-atlantic 0.0e+00 1e-02 cltc (%) 3e-04 clivi (kg m⁻²) _lom lom) smb $(kg m^{-2} s^{-1})$ 0e+00expression -1e-02 5.0e-03 0.0e + 0020002001200220032004 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 SO4 lifetime SO2 lifetime – – NH–atlantic load load load of so2 - NH-atlantic of so4 - NH-atlantic of bc - NH-atlantic - NH-atlantic wetso4) (days -1.0e-08 oadso2/emiso2 (days) loadso4 (kg m⁻²) oadso2 (kg m⁻²) oadbc $(kg m^{-2})$ 0e+00 oadso4/(dryso4+ -2.0e-08 -5e-10 -1e-09 -1.0e-0.72000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2001 2002 2004 2000 2001 2002 2003 Year Year Year Year Year NorESM2 CAM-ATRAS F3SM GFDI -FSM4

CESM1

GEOS

GISS modelE