Supplementary Table S2. Atmospheric species in the Archean photochemical code with lower boundary condition type and values. Lower boundary conditions are given in cm/s for deposition velocity (Vdep), a dimensionless mixing ratio by volume for fixed concentration (f_o), and molecules/cm^2/s for flux (flux). Species names ending in "AER" are types of aerosols.

Species	Lower Boundary Type	Vdep/f_0/flux
	Long-Lived Species	
O	constant deposition velocity	1
O_2	constant mixing ratio	$1 \cdot 10^{-08}$
H_2O	constant deposition velocity	0
H	constant deposition velocity	1
OH	constant deposition velocity	1
HO_2	constant deposition velocity	1
H_2O_2	constant deposition velocity	$2 \cdot 10^{-01}$
H_2	constant deposition velocity*	$2.4 \cdot 10^{-04}$
CO	constant deposition velocity	$1.2 \cdot 10^{-04}$
HCO	constant deposition velocity	1
H_2CO	constant deposition velocity	$2 \cdot 10^{-01}$
CH_4	constant mixing ratio	variable†
CH_3	constant deposition velocity	1
C_2H_6	constant deposition velocity	0
NO	constant deposition velocity	$3 \cdot 10^{-04}$
NO_2	constant deposition velocity	$3 \cdot 10^{-03}$
HNO	constant deposition velocity	1
O_3	constant deposition velocity	$7 \cdot 10^{-02}$
HNO_3	constant deposition velocity	$2 \cdot 10^{-01}$
N	constant deposition velocity	0
H_2S	constant deposition velocity*	$2 \cdot 10^{-02}$
HS	constant deposition velocity	0
S	constant deposition velocity	0
SO	constant deposition velocity	0
SO_2	constant deposition velocity*	1
SO_3	constant deposition velocity	0
H_2SO_4	constant deposition velocity	1
HSO	constant deposition velocity	1
S_2	constant deposition velocity	0
C_2	constant deposition velocity	0
CH	constant deposition velocity	0
C_2H	constant deposition velocity	0
$CH_2{}^3$	constant deposition velocity	0
C_2H_5	constant deposition velocity	0
C_2H_2	constant deposition velocity	0
C_2H_4	constant deposition velocity	0
C_3H_8	constant deposition velocity	0
C_3H_7	constant deposition velocity	0
C_3H_5	constant deposition velocity	0
C_2H_3	constant deposition velocity	0
C_3H_6	constant deposition velocity	0

C_3H_2	constant deposition velocity	0
C_3H_3	constant deposition velocity	0
CH_2CCH_2	constant deposition velocity	0
CH_2CO	constant deposition velocity	0
CH_3CO	constant deposition velocity	0
CH_3CHO	constant deposition velocity	0
CH_3O	constant deposition velocity	0
CH_3O_2	constant deposition velocity	0
C_2H_4OH	constant deposition velocity	0
C_2H_2OH	constant deposition velocity	0
C_2H_5CHO	constant deposition velocity	0
CH_3C_2H	constant deposition velocity	0
CS_2	constant deposition velocity	0
HCS	constant deposition velocity	0
OCS	constant deposition velocity	0
CS	constant deposition velocity	0
SO_4AER	constant deposition velocity	$1 \cdot 10^{-02}$
S_8AER	constant deposition velocity	$1 \cdot 10^{-02}$
HCAER	constant deposition velocity	$1 \cdot 10^{-02}$
HCAER2	constant deposition velocity	$1 \cdot 10^{-02}$
	Short-Lived Species	
HNO_2	constant deposition velocity	0
O^1D	constant deposition velocity	0
CH_2^1	constant deposition velocity	0
C	constant deposition velocity	0
SO_2^1	constant deposition velocity	0
SO_2^3	constant deposition velocity	0
HSO_3	constant deposition velocity	0
OCS_2	constant deposition velocity	0
CS_2*	constant deposition velocity	0
S_3	constant deposition velocity	0
S_4	constant deposition velocity	0
	Inert Species	
CO_2	constant mixing ratio	variable†
N_2	constant mixing ratio	remainder‡

* - In addition to a constant deposition velocity, we also use a volcanic flux for these gases. Specifically, we used volcanic fluxes of $3.5 \cdot 10^9$ molecules/cm^2/s of H_2, $1 \cdot 10^{10}$ molecules/cm^2/s of SO_2, and $3.5 \cdot 10^8$ molecules/cm^2/s of H_2S.

† - See text for information on these mixing ratios.

‡ - N_2 fills the remainder of the atmosphere.