SOCOLv3-CCMI (Revell et al., 2015)
Interactive lightning NO\textsubscript{x}
Tropospheric chemistry scheme (MIM-1)
Energetic particles’ effects
Extra NMVOCs contribution to CO
Extra-heating in Hartley and Huggins bands

SOCOLv3 (Stenke et al., 2013)
T42 and L39 resolution

SOCOL-AER (Sheng et al., 2015)
Sulfur chemistry
Interactive sulfate aerosol scheme (AER)

SOCOLv3.1 (Revell et al., 2018)
Interactive wet/dry deposition
Heterogeneous hydrolysis of N\textsubscript{2}O\textsubscript{5} on tropospheric aerosols

SOCOL-AERv2 (Feinberg et al., 2019)
Updates and corrections to AER
Reaction rates update to JPL-18

SOCOLv4 (this paper)
T63 and L47 resolution
ECHAM6 core
Interactive ocean
CMIP6 boundary conditions
Corrections to photolysis
New hODS and VSLS species