

Model run	Specification
$R_{\text{all}}$	Full model run including all reactions described in Table 1, including the DMSO and MSIA intermediates; sea surface water DMS concentration obtained from Lana et al. (2011)
$R_{\text{std}}$	Standard run which includes gas-phase oxidation of DMS by OH and NO <sub>3</sub> only, with no DMSO or MSIA intermediates; sea surface water DMS concentration obtained from Lana et al. (2011)
$R_{\text{Kettle}}$	$R_{\text{all}}$ ; sea surface water DMS concentration obtained from Kettle et al. (1999)
$R_{\text{noDMS+BrO}}$	$R_{\text{all}}$ ; without DMS + BrO reaction
$R_{\text{noMUL}}$	$R_{\text{all}}$ ; without multiphase oxidation of DMS, DMSO, MSIA and MSA
$R_{\text{noMSA+OH(aq)}}$	$R_{\text{all}}$ ; without MSA + OH <sub>(aq)</sub> reaction
$R_{\text{moreMSA+OH(aq)}}$	$R_{\text{all}}$ ; $k_{\text{MSA+OH(aq)}} \times 4.7$ (Milne et al., 1989)
$R_{\text{lowOH(aq)}}$	$R_{\text{all}}$ ; OH <sub>(aq)</sub> concentrations in cloud droplets and aerosols reduced by a factor of 100
$R_{\text{add}}$	$R_{\text{all}}$ ; a unity yield of DMSO for the addition channel of DMS + OH reaction*
$R_{10\text{Cl}}$	$R_{\text{all}}$ ; Cl mixing ratios increased by a factor of 10
$R_{\text{all\_onlyDMS}}$	$R_{\text{all}}$ ; DMS emission from the ocean as the only sulfur source
$R_{\text{std\_onlyDMS}}$	$R_{\text{std}}$ ; DMS emission from the ocean as the only sulfur source