

Comparison between v8-03-02 1-year simulation before and after sea salt updates

Base model v8-03-02 (sea salt with default bins 0.1-0.5; 0.5-4 μ m)

New model v8-03-02 with new sea salt emissions, dry deposition and hygroscopic growth (sea salt bins: 0.01-0.5 and 0.5-8 μ m).

1-year simulation 20050701-20060801; 4x5 degree resolution GEOS-5

Sea salt budgets for Base model

	SALA (0.1-0.5)	SALC (0.5-4)	Total
Emissions (Tg/yr)	70	2040	2110
Dry deposition (Tg/yr)	10	730	740
Wet deposition (Tg/yr)	60	310	370
Lifetime (days)	1.01	0.65	0.66
Mean mass (mg/m ²)	0.38	7.1	7.5

Sea salt budget for New model

	SALA (0.1-0.5)	SALC (0.5-8)	Total
Emissions (Tg/yr)	54	3300	3354
Dry deposition (Tg/yr)	2	1520	1522
Wet deposition (Tg/yr)	52	1780	1832
Lifetime (days)	1.06	0.5	0.51
Mean mass (mg/m ²)	0.31	8.9	9.25

The changes in sea salt burden are due to changes in emissions and in the dry deposition velocities. Globally, the sea salt burden decreases by 20% for SALA and increases by 25% for SALC. Spatially, the changes are much larger as sea salt emissions increase in the tropics and decrease at high latitudes. For SALA, surface concentrations increase by 50-100% in the Tropics and decrease by 20-50% at high latitudes (Figure 1). For SALC, there is a factor of 2-3 increase in the Tropics and a 30-50% decrease at high latitudes (Figure 2).

These changes in sea salt aerosol have relatively little influence on the surface concentrations of other species:

NO_x: ~5% decrease in Tropics ~5% increase at high latitudes (very small absolute changes)

O_x: less than 0.1 ppbv decrease over tropical oceans.

CO: less than 0.1% decrease globally.

HNO₃: less than 5 pptv change (large change over Arctic and Antarctic in terms of percentage).

SO₂ and SO₄: 1-3% decrease over remote oceans.

SO₄s: factor of 2-3 increase over remote tropical oceans.

Figure 1. Comparison between Base model and New model (new sea salt): Surface mixing ratio of SALA for July 2006

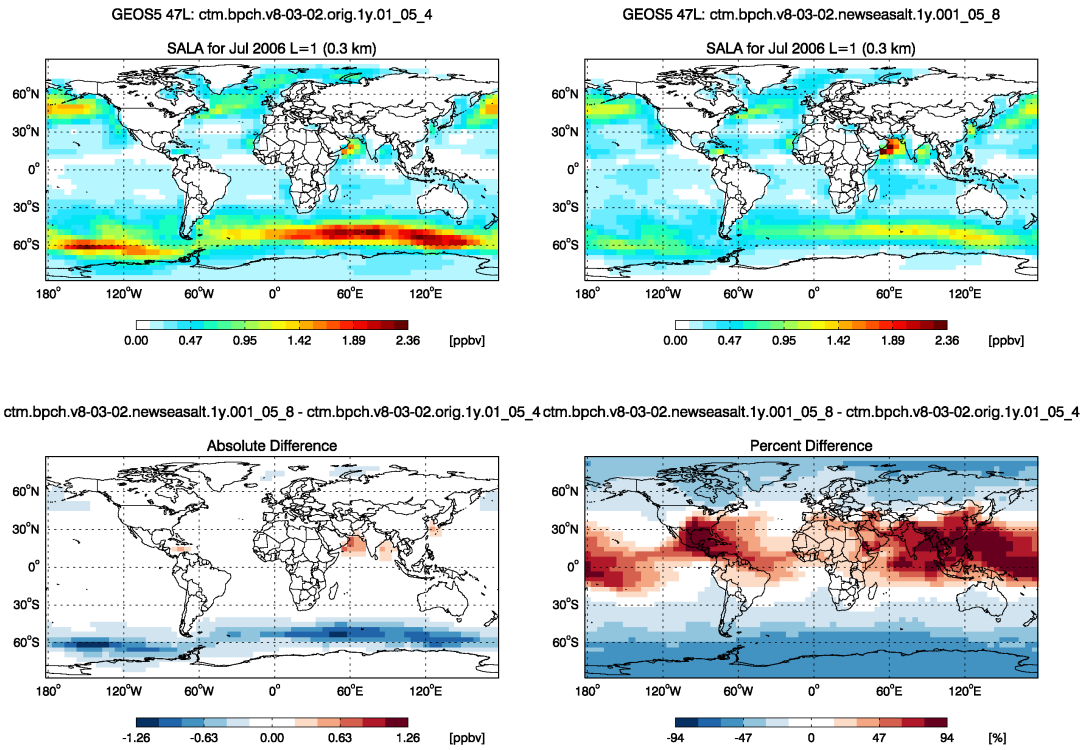


Figure 2. Comparison between Base model and New model (new sea salt): Surface mixing ratio of SALC for July 2006.

