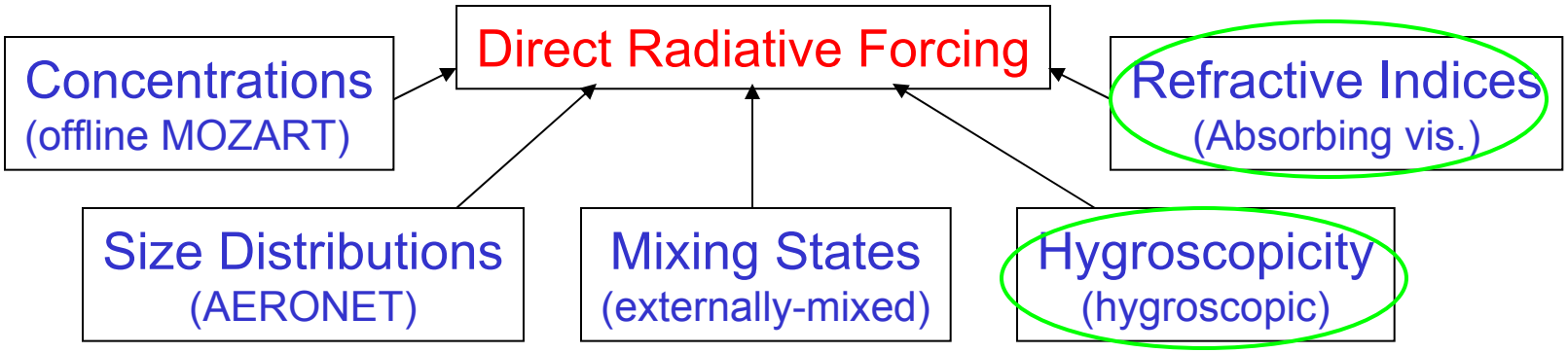
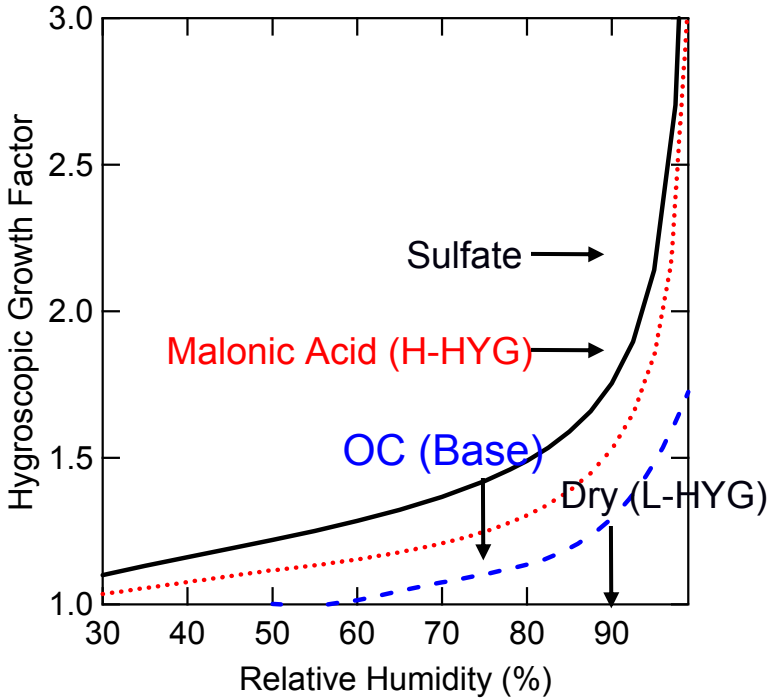
Clear-sky Direct Radiative Forcing (DRF) of Organic Aerosols

Yi Ming*, V. Ramaswamy, and Paul Ginoux

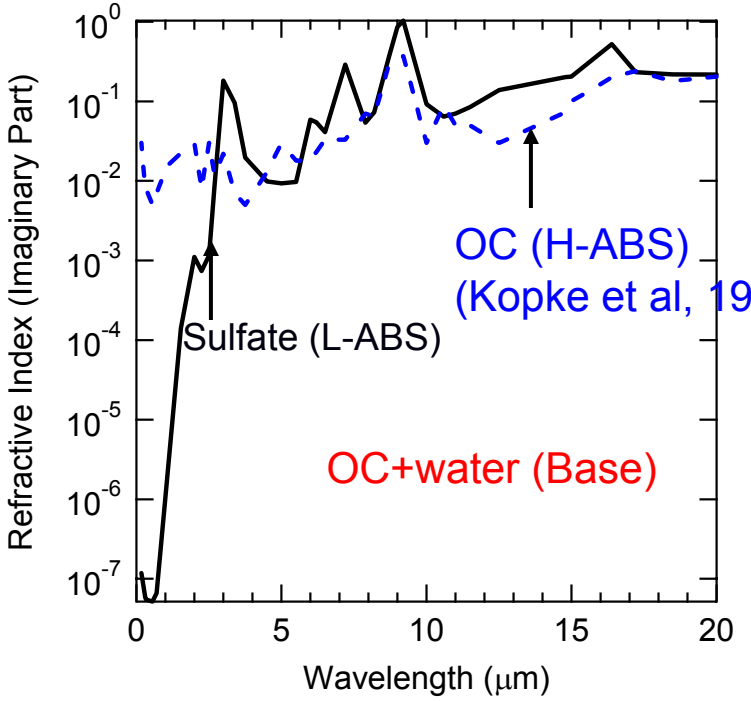


Ming & Russell, JGR, 106,28259,2001
Ming & Russell, AICHE J., 48, 1131, 2002

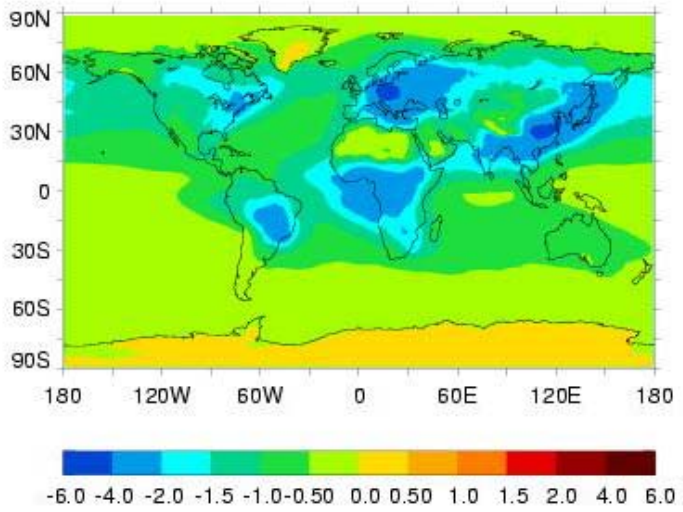
•Hygroscopicity



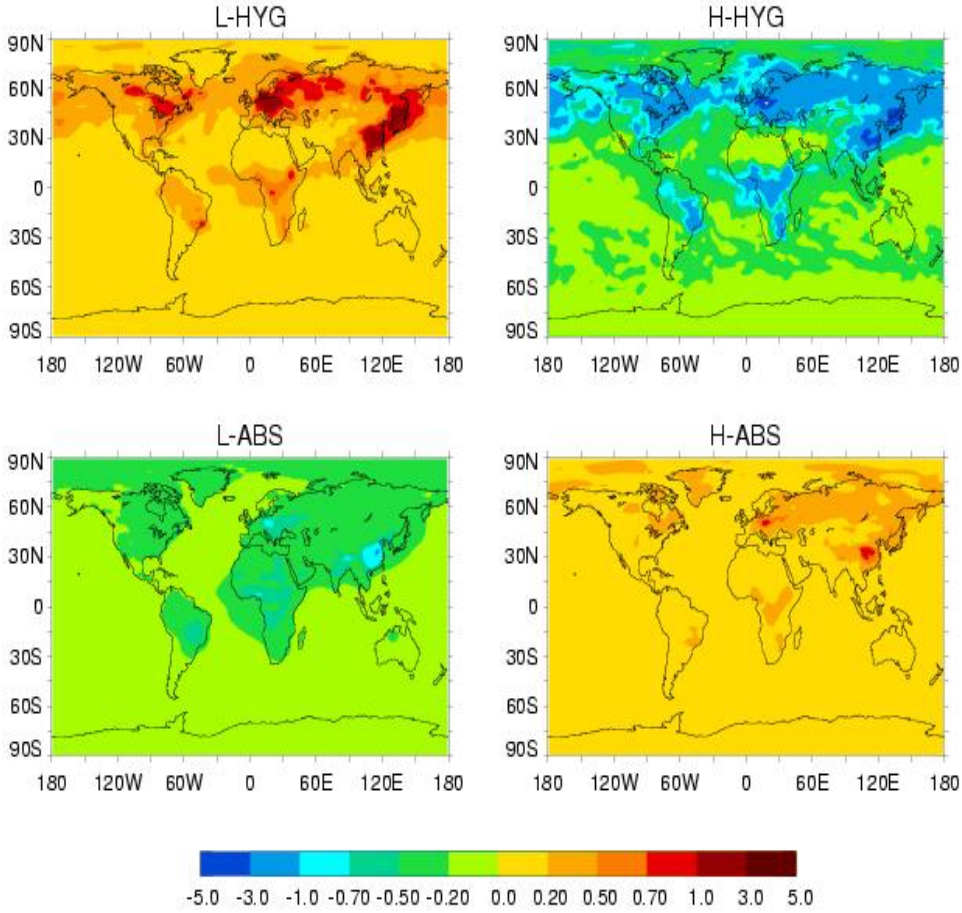
•Refractive Indices



Clear-sky DRF (BASE) (W/m^2)



Sensitivity Cases - BASE (W/m^2)



Annual Mean (W/m^2)

	Clear-sky	Surface
BASE	-0.91	-0.74
L-HYG-BASE	+0.17	+0.05
H-HYG-BASE	-0.42	-0.08
L-ABS-BASE	-0.14	+0.17
H-ABS-BASE	+0.06	-0.05

Two effects of hygroscopic growth
- Increase extinction coefficients.
- Increase single-scattering albedos.

Comparison with Other Studies

	Hygroscopic	Absorption	Burden (Tg OC)	Total-Sky DRF (W/m^2)	Normalized Forcing (W/g OC)
This study	**YES**	**YES**	1.19	-0.43	**-185**
Cook et al. [1999]*	**NO**	**YES**	0.087	-0.012	**-70**
Koch [2001]	**YES**	**NO**	0.73	-0.30	**-210**
Jacobson [2001]	**NO**	**YES**	0.68	-0.063	**-47**
Chung and Seinfeld [2002]	**YES**	**YES**	1.14	-0.18	**-76**
Takemura et al. [2002]	**YES**	**YES**	0.73	-0.24	**-170**
Reddy et al. [2004]	**YES**	**YES**	1.0	-0.30	**-146**

* Only fossil fuel sources