Aerosol and component life cycle diversity: organics

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6 years passed…

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Atmospheric Chemistry and Physics Open Access

The AeroCom evaluation and intercomparison of organic aerosol in global models

K. Tsigaridis[1,2], N. Daskalakis[3,4], M. Kanakidou[3], P. J. Adams[5,6], P. Artaxo[7], R. Bahadur[8], Y. Balkanski[9], S. E. Bauer[1,2], N. Bellouin[10,a], A. Benedetti[11], T. Bergman[12], T. K. Berntsen[13,14], J. P. Beukes[15], H. Bian[16], K. S. Carslaw[17], M. Chin[18], G. Curci[19], T. Diehl[18,20], R. C. Easter[21], S. J. Ghan[21], S. L. Gong[22], A. Hodzic[23], C. R. Hoyle[24,25], T. Iversen[11,26,13], S. Jathar[5], J. L. Jimenez[27], J. W. Kaiser[28,11,29], A. Kirkevåg[26], D. Koch[1,2,b], H. Kokkola[12], Y. H Lee[5,c], G. Lin[30], X. Liu[21,d], G. Luo[31], X. Ma[32,e], G. W. Mann[33,34], N. Mihalopoulos[3], J.-J. Morcrette[11], J.-F. Müller[35], G. Myhre[14], S. Myriokefalitakis[3,4], N. L. Ng[36], D. O'Donnell[37,f], J. E. Penner[30], L. Pozzoli[38], K. J. Pringle[39,29], L. M. Russell[9], M. Schulz[26], J. Sciare[9], Ø. Seland[26], D. T. Shindell[2,1,g], S. Sillman[30], R. B. Skeie[14], D. Spracklen[17], T. Stavrakou[35], S. D. Steenrod[20], T. Takemura[40], P. Tiitta[15,41], S. Tilmes[23], H. Tost[42], T. van Noije[43], P. G. van Zyl[15], K. von Salzen[32], F. Yu[31], Z. Wang[44], Z. Wang[45], R. A. Zaveri[21], H. Zhang[44], K. Zhang[21,37], Q. Zhang[46], and X. Zhang[45]

OA literature worth looking into

Processes

AGU PUBLICATIONS

Reviews of Geophysics

REVIEW ARTICLE
10.1002/2016RG000540

Recent advances in understanding secondary organic aerosol: Implications for global climate forcing

Manish Shrivastava[1], Christopher D. Cappa[2], Jiwen Fan[1], Allen H. Goldstein[3], Alex B. Guenther[4], Jose L. Jimenez[5], Chongai Kuang[6], Alexander Laskin[1], Scot T. Martin[7], Nga Lee Ng[8], Tuukka Petaja[9], Jeffrey R. Pierce[10], Philip J. Rasch[1], Pontus Roldin[11], John H. Seinfeld[12], John Shilling[1], James N. Smith[4], Joel A. Thornton[13], Rainer Volkamer[5], Jian Wang[6], Douglas R. Worsnop[14], Rahul A. Zaveri[1], Alla Zelenyuk[1], and Qi Zhang[15]

Key Points:
- We review some important developments in secondary organic aerosol (SOA) that could impact aerosol radiative forcing and response of climate to greenhouse gases
- We highlight some of the important processes that involve interactions between natural biogenic emissions and anthropogenic emissions
- We discuss fundamental SOA properties volatility and viscosity and their relation to evolution of aerosol mass and number concentrations in the atmosphere

Climate impacts

Current Climate Change Reports
https://doi.org/10.1007/s40641-018-0092-3

AEROSOLS AND CLIMATE (O BOUCHER AND S REMY, SECTION EDITORS)

CrossMark

The Present and Future of Secondary Organic Aerosol Direct Forcing on Climate

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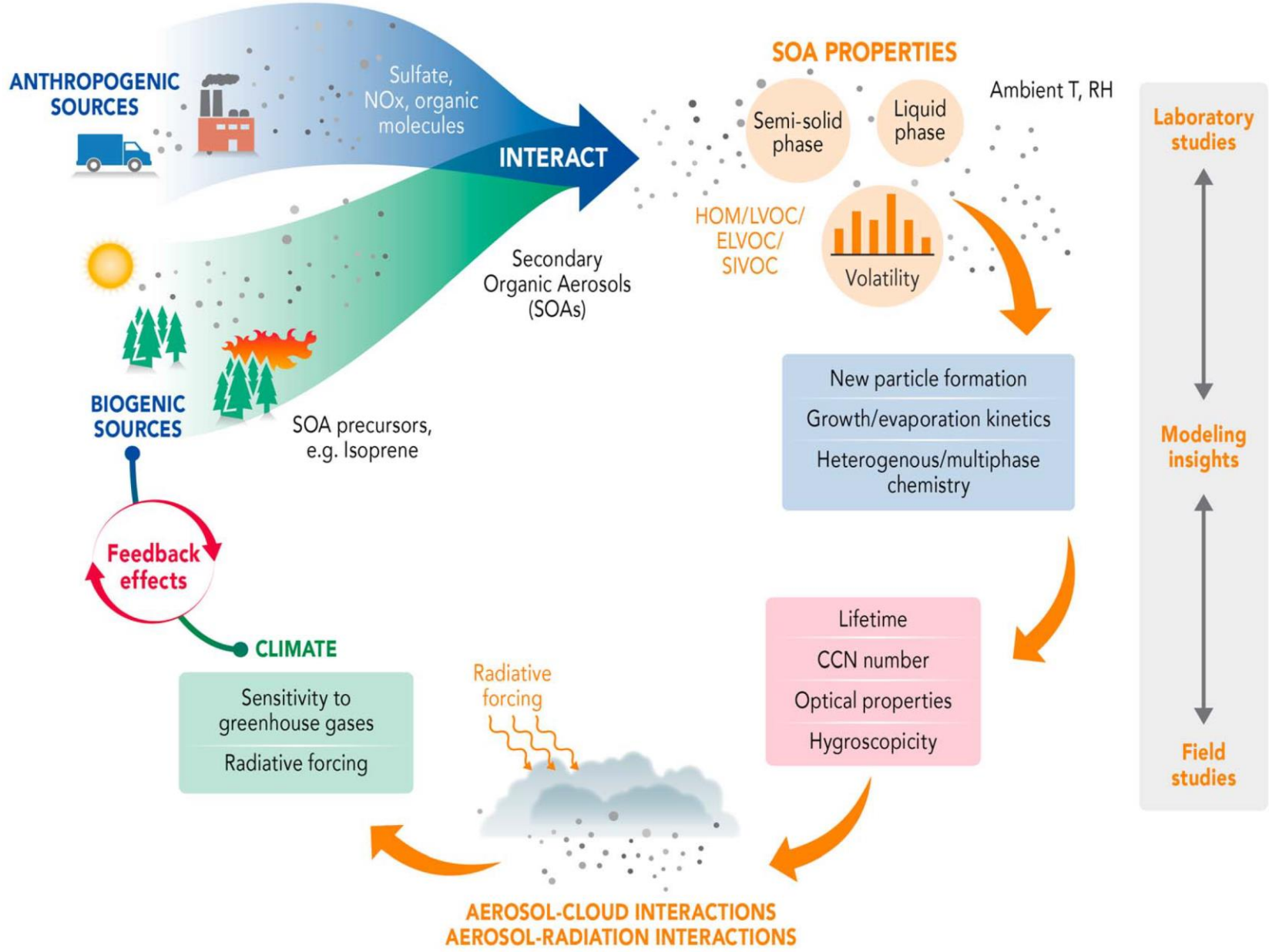
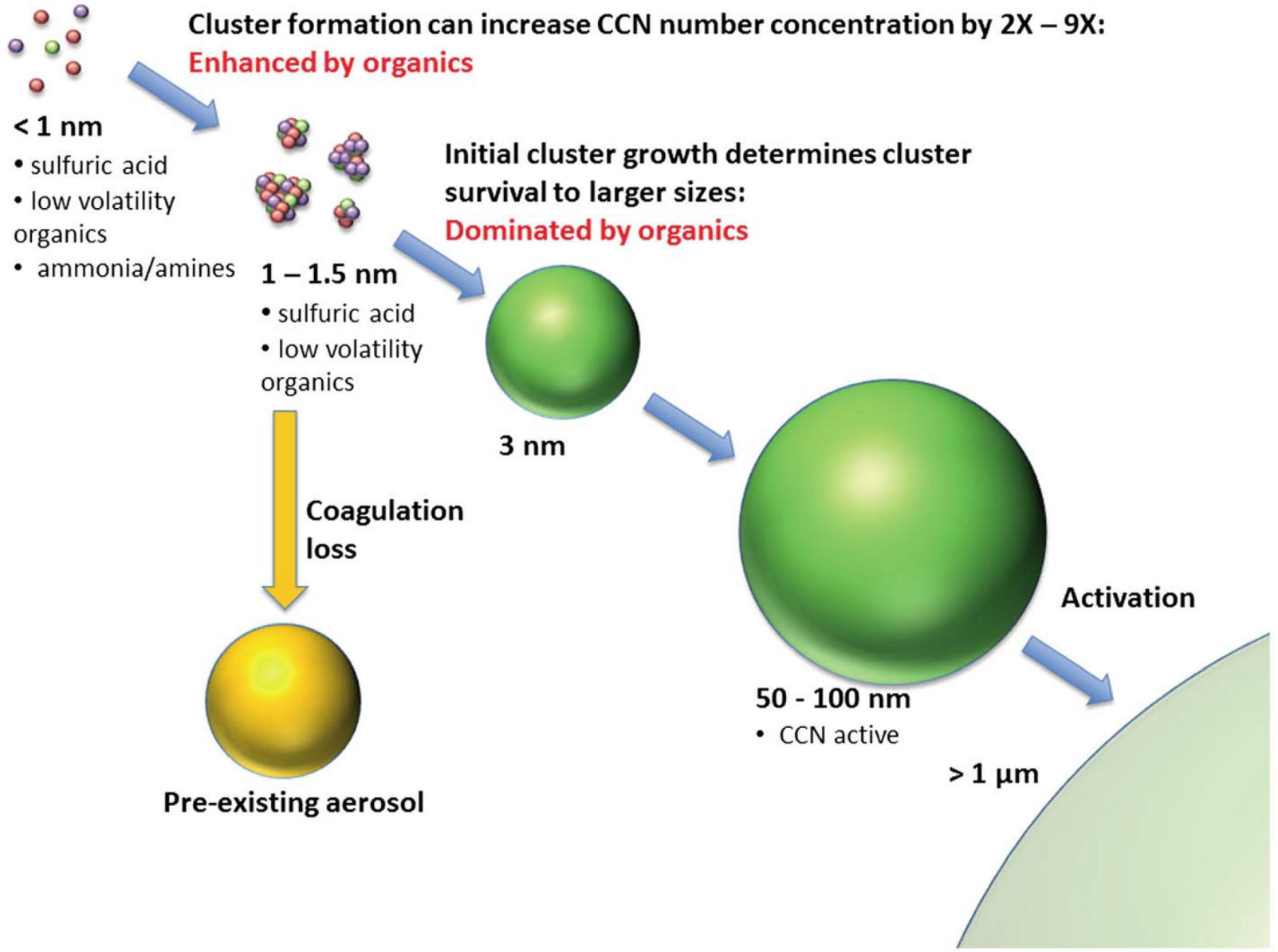
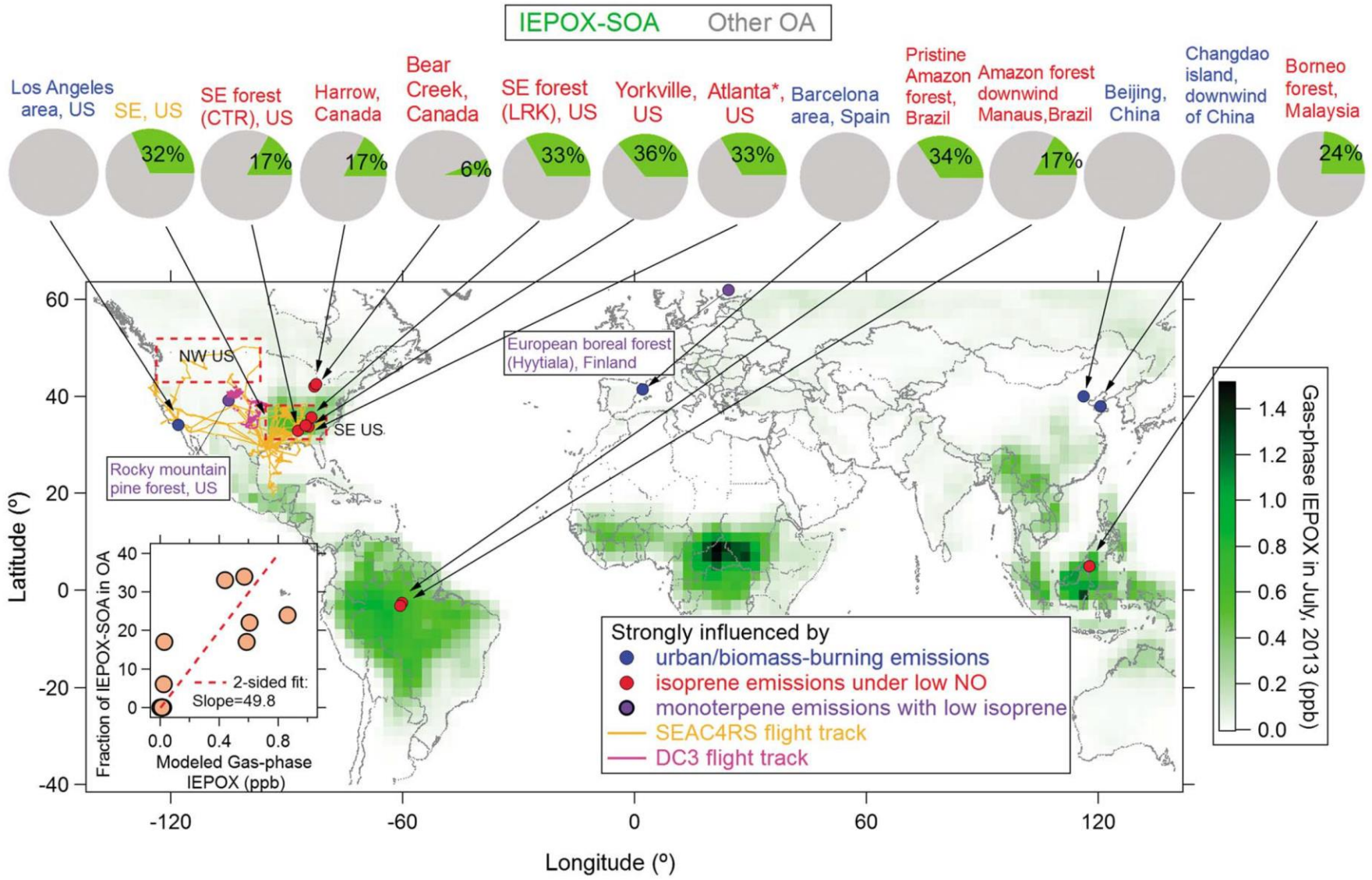
Shrivastava et al., 2017



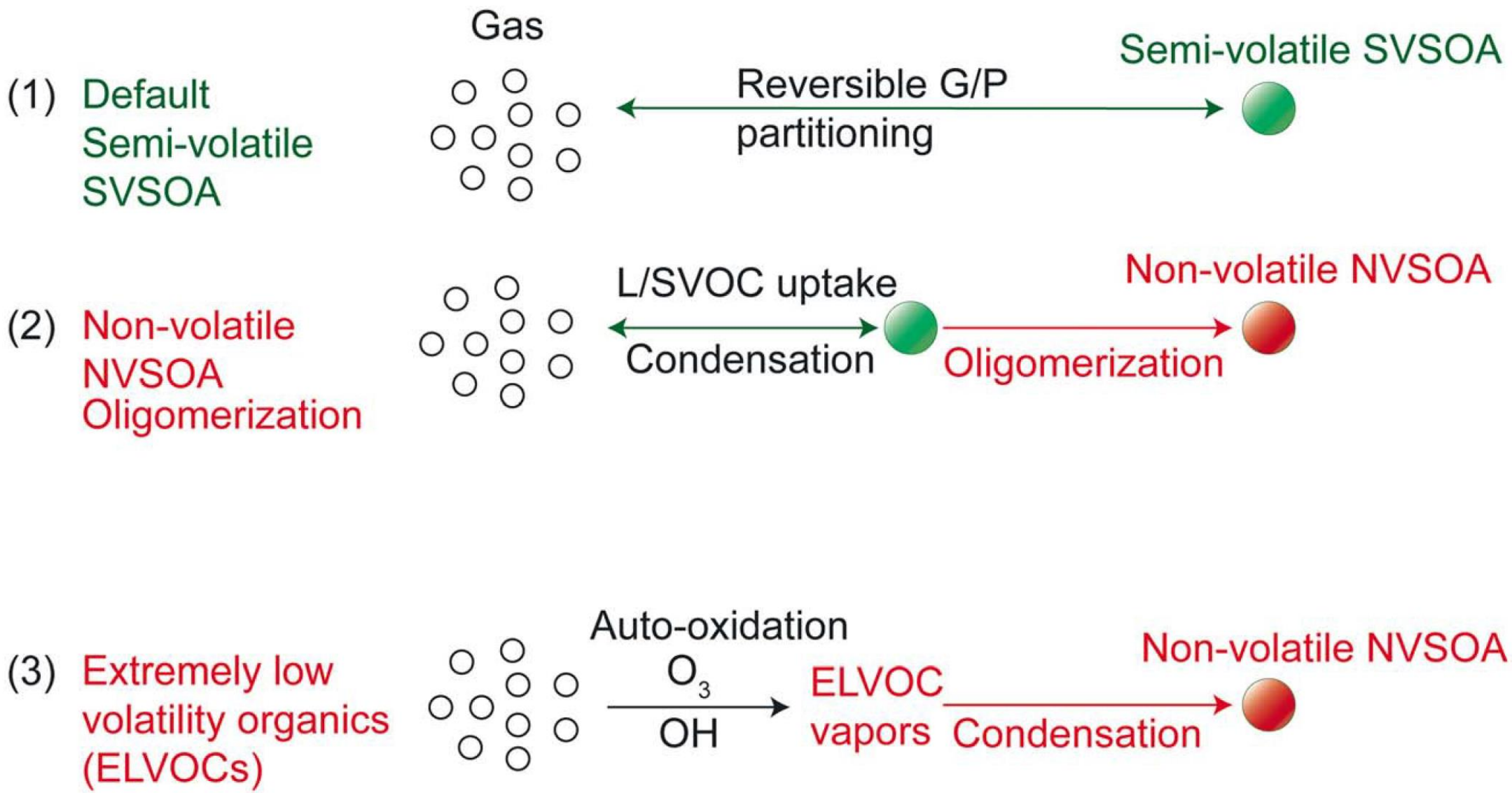
Shrivastava et al., 2017



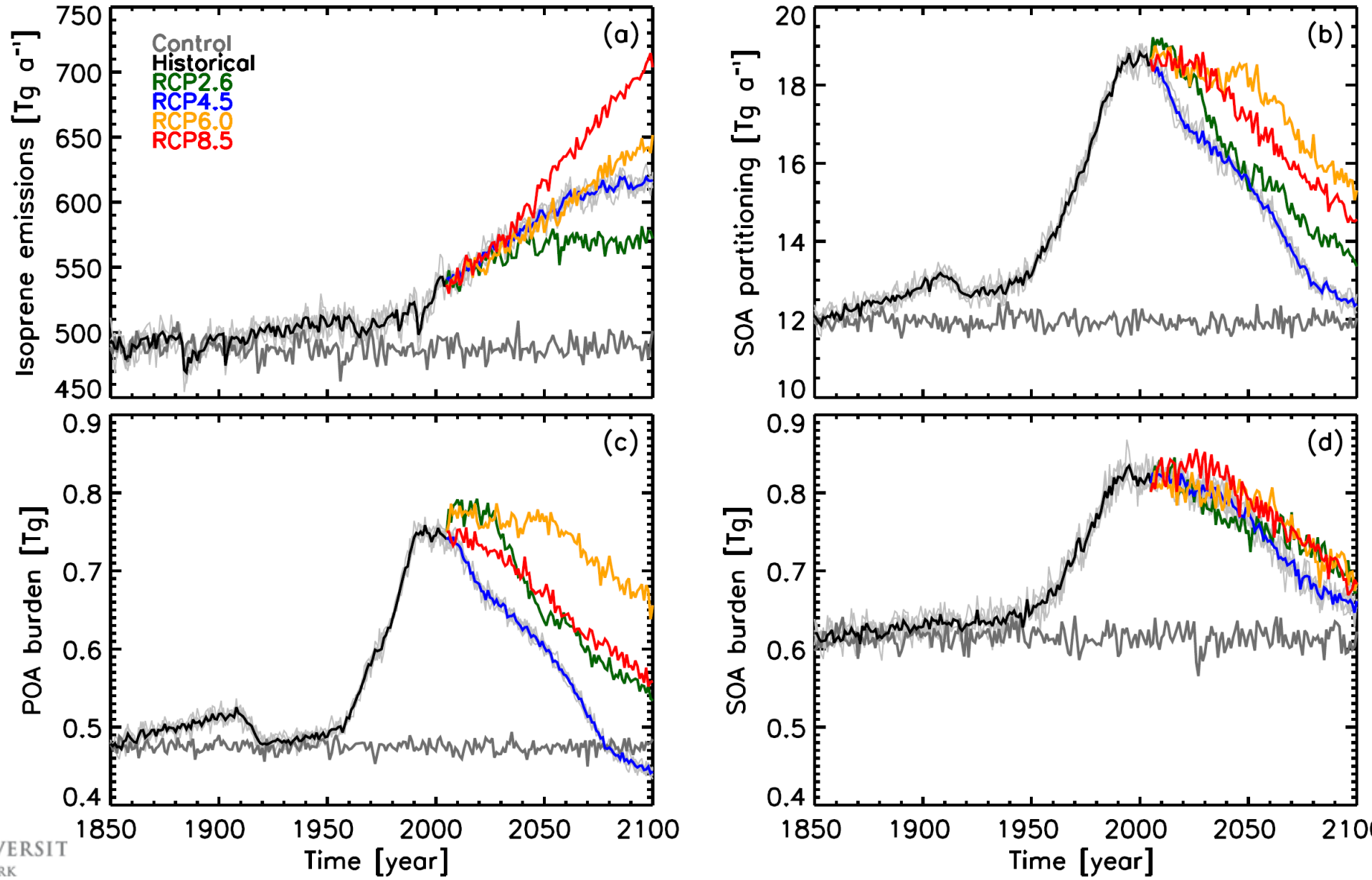
Shrivastava et al., 2017



Shrivastava et al., 2017



Tsigaridis and Kanakidou, 2018



Food for thought

- Now many of us modelers have improved their models by using VBS, but ignoring:
  - Nucleation
  - IEPOX
  - Aerosol phase (liquid or solid)
  - SOA photolysis
  - Oligomerization
  - xxxVOC species
  - Brown carbon
  - Accurate temperature dependence
  - Chemical regime dependence

- How much do/should we care?
  - Is the answer different for CTMs and GCMs?
  - The answer IS different for global vs. regional vs. local vs. campaign studies.