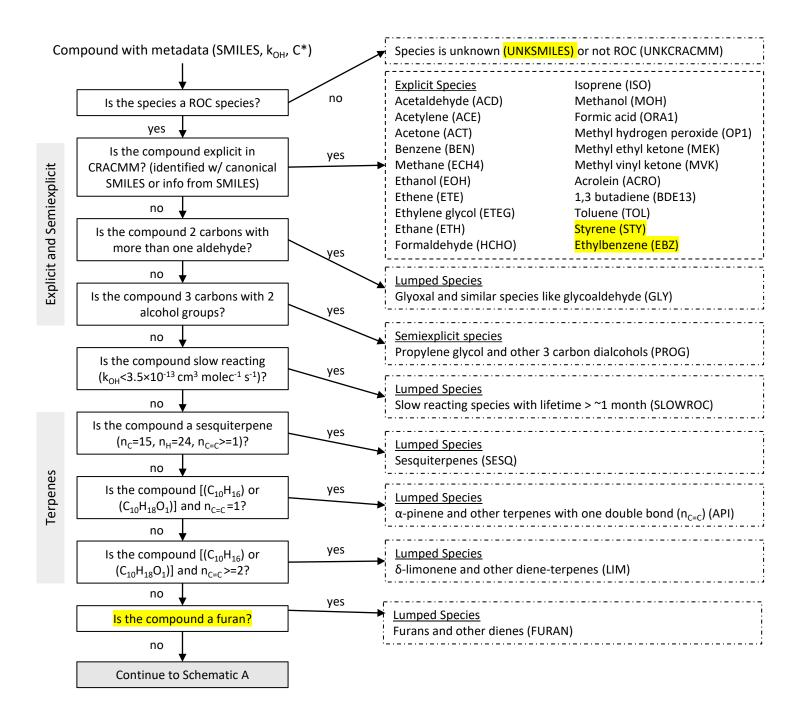
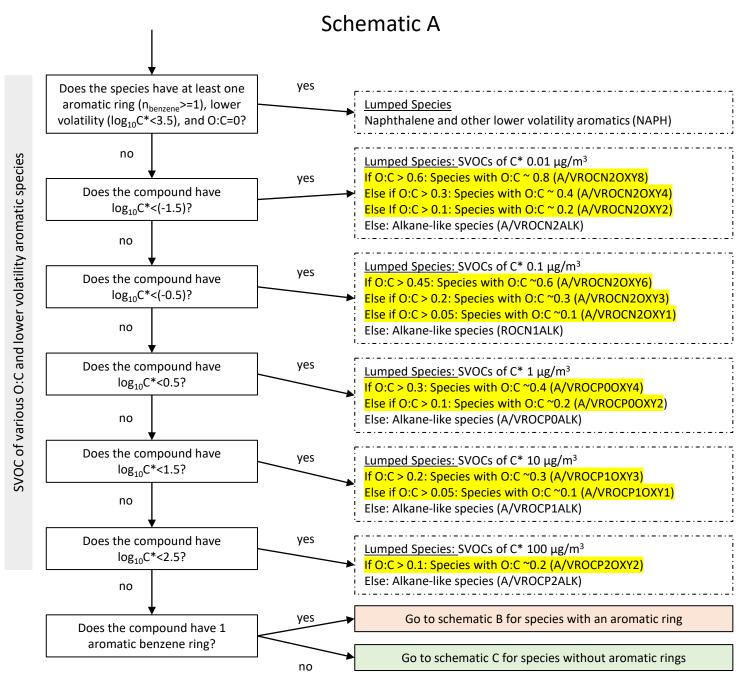
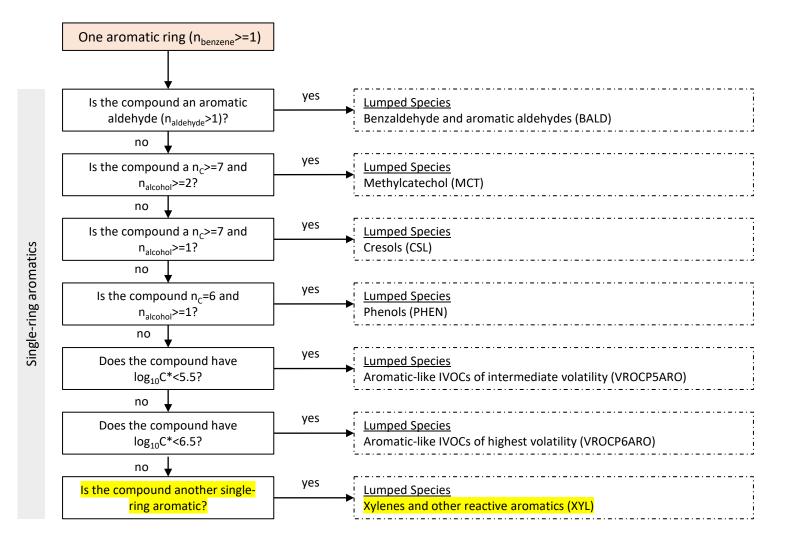
CRACMMv2.0 Emissions Mapping, Updated 8/16/2024



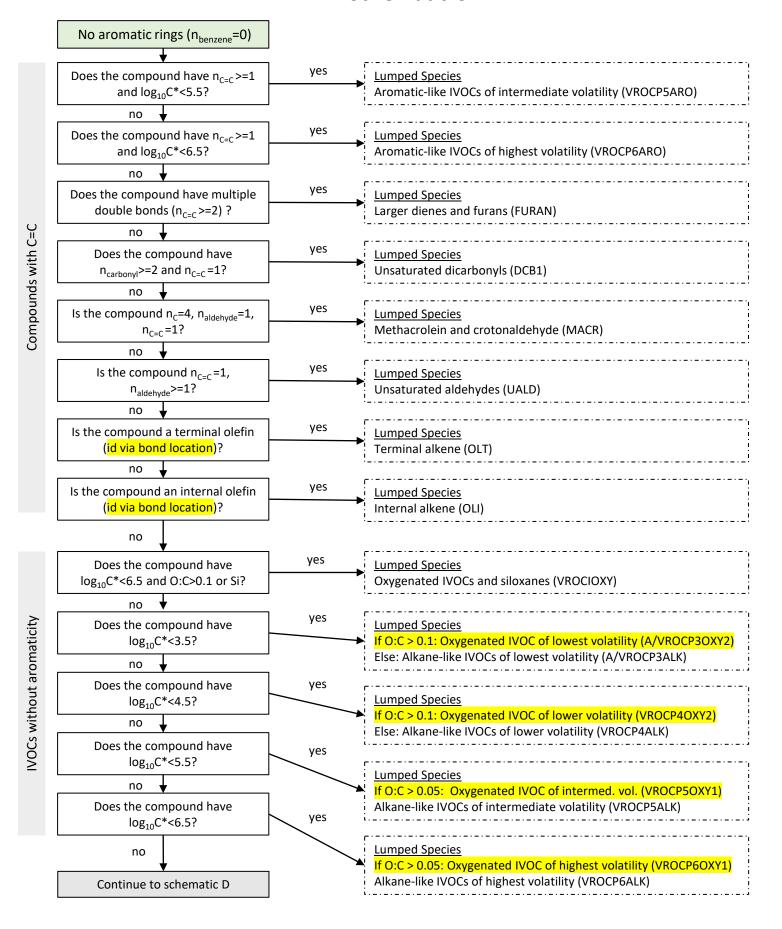
CRACMMv2.0 Emissions Mapping, Updated 8/16/2024



CRACMMv2.0 Emissions Mapping, Updated 8/16/2024 Schematic B



CRACMMv2.0 Emissions Mapping, Updated 8/16/2024 Schematic C



CRACMMv2.0 Emissions Mapping, Updated 8/16/2024 Schematic D yes Does the compound have **Lumped Species** methylglyoxal and similar, k_{OH} =1.5×10⁻¹¹ cm³ molec⁻¹ s⁻¹ (MGLY) $n_{aldehvde} >= 1$ and $n_{ketone} >= 1$? yes Is the compound an aldehyde **Lumped Species** $(n_{aldehyde} >= 1)$? higher aldehydes (C>3), $k_{OH}=1.98\times10^{-11}$ cm³ molec⁻¹ s⁻¹ (ALD) yes Is the compound a peroxide **Lumped Species** higher organic peroxides, k_{OH} =6.4×10⁻¹² cm³ molec⁻¹ s⁻¹ (OP2) $(n_{peroxide} > = 1)$? Oxygenated Species yes Is the compound a hydroxy ketone hydroxy ketone, k_{OH} =3.0×10⁻¹² cm³ molec⁻¹ s⁻¹ (HKET) $(n_{alcohol} > = 1 \text{ and } n_{ketone} > = 1)$? no Is the compound a ketone yes all other ketones, $k_{OH} = 2.9 \times 10^{-12} \text{ cm}^3 \text{ molec}^{-1} \text{ s}^{-1}$ (KET) $(n_{ketone} > = 1)$? no yes Is the compound a nitrate Lumped Species organic nitrates, k_{OH} =2.2×10⁻¹² cm³ molec⁻¹ s⁻¹ (ONIT) $(n_{nitrate} >= 1)$? no Is the compound an alcohol yes **Lumped Species** C3 and higher alcohols, k_{OH} =1.3e-12 (ROH) $(n_{alcohol} >= 1)$? no Is the compound an acid yes Lumped Species acetic and higher acids, $k_{OH} = 6.5 \times 10^{-13} \text{ cm}^3 \text{ molec}^{-1} \text{ s}^{-1}$ (ORA2) $(n_{acid}>=1)$? no yes Is species slow reacting **Lumped Species** $(k_{OH} < 3.4 \times 10^{-12} \text{ cm}^3 \text{ molec}^{-1} \text{ s}^{-1})$? Slow reacting species (HC3) no 'Alkanes" Is the species intermediate yes **Lumped Species** reacting ($k_{OH} >= 3.4 \times 10^{-12}$ and Moderately reacting species (HC5) $k_{OH} \le 6.8 \times 10^{-12} \text{ cm}^3 \text{ molec}^{-1} \text{ s}^{-1}$? yes Is the compound fast reacting **Lumped Species** $(k_{OH} > 6.8 \times 10^{-12} \text{ cm}^3 \text{ molec}^{-1} \text{ s}^{-1})$? Fast reacting species (HC10)

The CRACMM2 emission mapper includes some other updates for robustness that could result in small changes to mapped compounds. Some species can exist in a gas (V) or aerosol (A) phase. The python mapper includes an optional argument to label a species as gas or particle if two phases are possible. The user must specify the phase as input to the mapper (it is not diagnosed). The phase can be calculated based on C* and organic aerosol concentration outside the mapper.

 C^* are always in $\mu g \ m^{-3}$ in this diagram.

Unknowns may be of 3 types:

UNKKOH: unknown k_{OH} (correct by specifying better surrogate).

Unknown (UNKCRACMM)

- UNKSMILES: unknown SMILES (correct by specifying better surrogate).
- UNKCRACMM: unknown in mapping. All ROC species eventually get classified by k_{OH}, but species that do not have any carbon atoms or are elemental carbon do not get mapped.

RACM2 SI: https://ars.els-cdn.com/content/image/1-s2.0-S1352231012011065-mmc1.pdf CMAQ Implementation of RACM2: