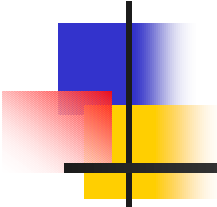


Comparing the Point and Non-Point Source Emission Inventory to Ambient Data in Houston: A Fine-Resolution Approach



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TCEQ

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Study

- Use of 10-deg wind bins for VOC:NO_x ratio comparison
- Done for 15 VOC classes
- Clinton and Deer Park
- Hours 5 and 6 cst, year-round, 1999-2001 ambient data used
 - Done for 30m and 600m plume rise cutoff (seasonal variation in mixing ht 0500-0659) – 600m shown here



Study

- Inventory: sources up to 14 km from monitor were included
- Non-point sources: converted from 2x2 grid cells to “pseudo-points”, which allows conversion from cartesian to polar (wind bin) grid
- Point Sources: used actual EPNs (version 15a), rather than gridded emissions
- Emissions weighted $1/d$

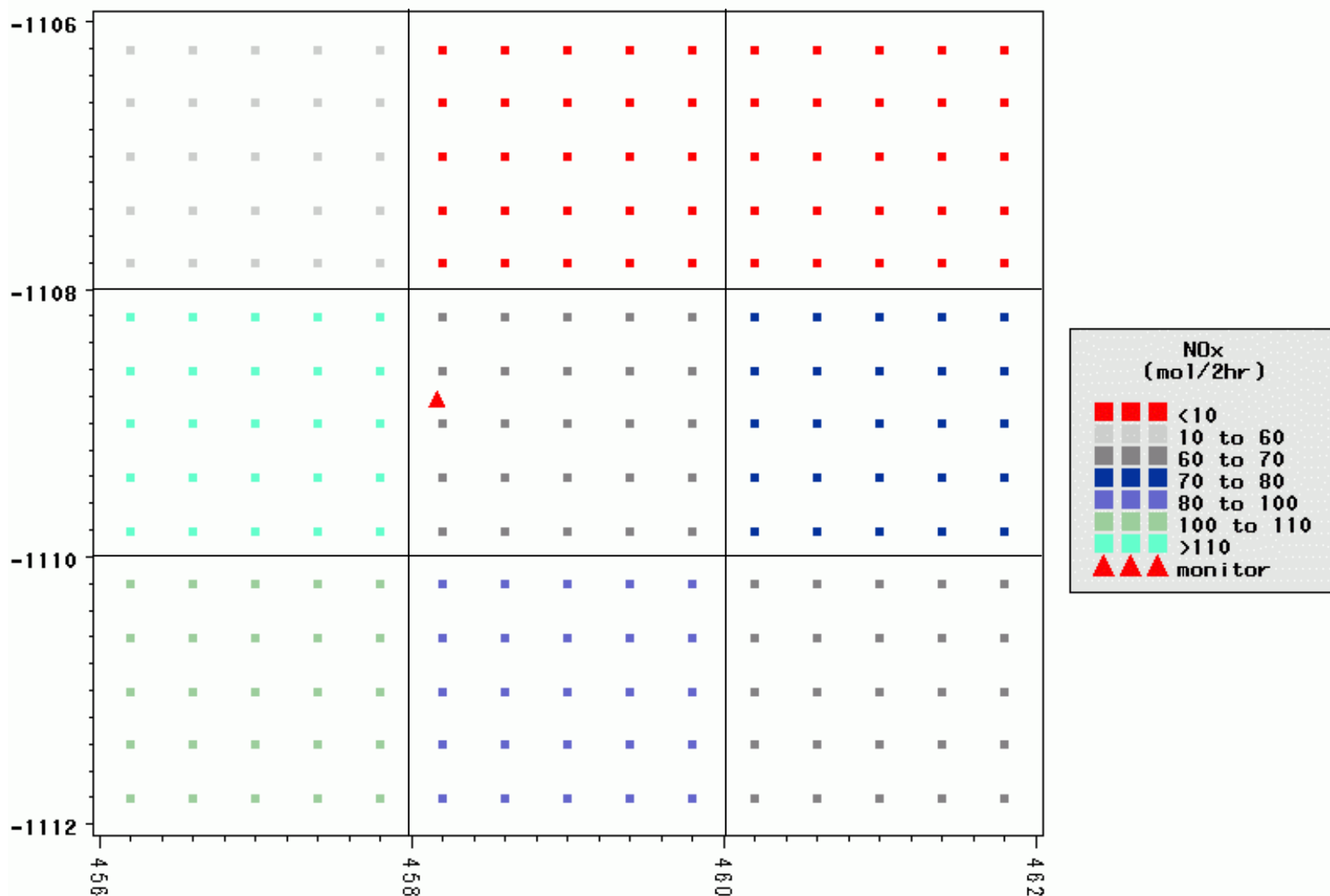


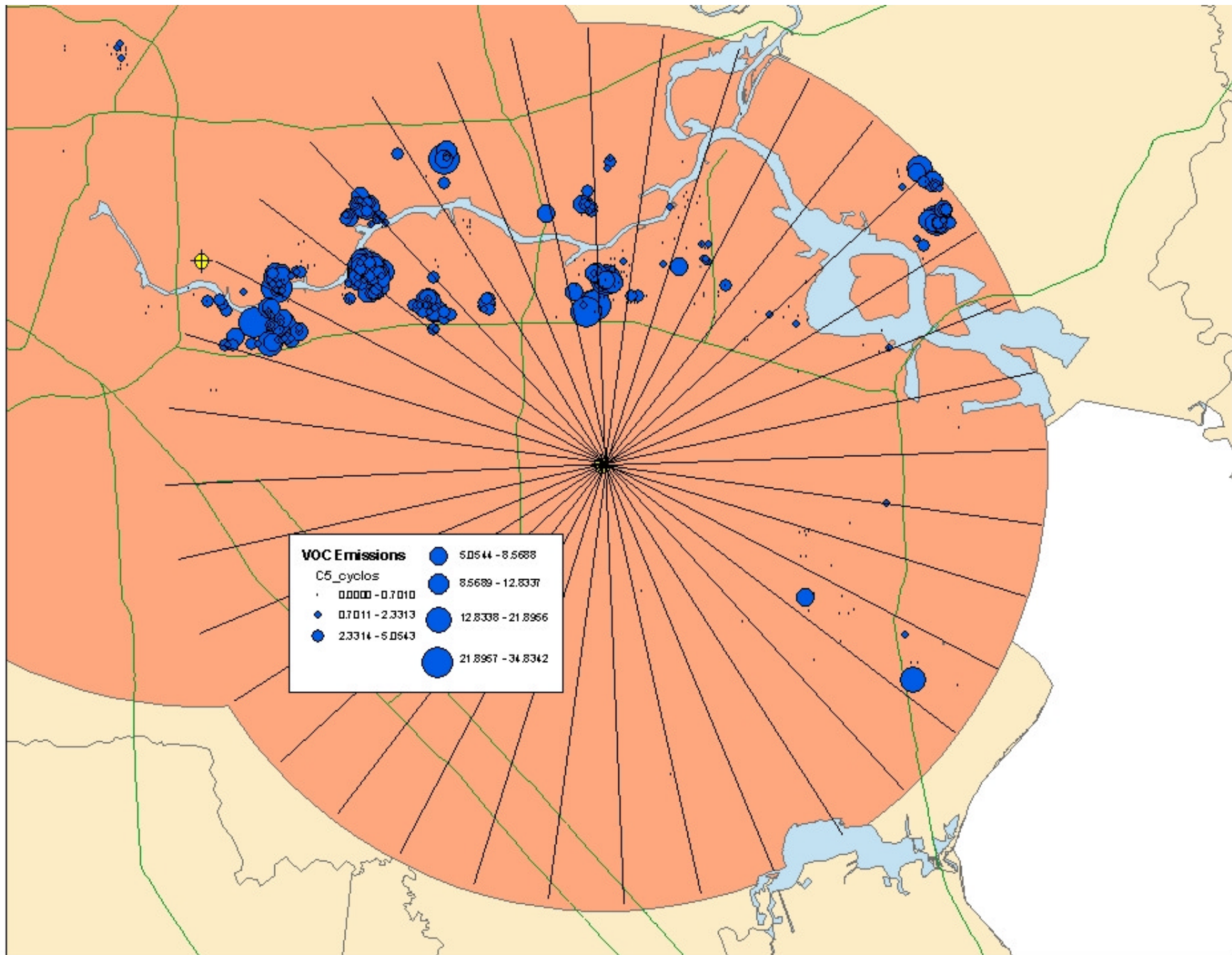
15 VOC Classes

- 1) **propylene**
- 2) **ethylene**
- 3) **C2C3**=sum(ethan, acety, propa);
- 4) **butadiene**;
- 5) **butenes**=sum(t2bte, _1bute, c2bte);
- 6) **butanes**=sum(isbta, nbuta);
- 7) **pentanes**=sum(ispna, npnta);
- 8) **pentenes**=sum(_2m2be, t2pne, _3m1be, _1pnte, c2pne);
- 9) **isoprene**=ispre;
- 10) **c5_cyclos**=sum(cypna, cypne);
- 11) **hexanes**=sum(nhexa, _22dmb, _3mpna, _23dmb, _2mpna);
- 12) **c6_ arom**=benz;
- 13) **c6_cyclos**=sum(mcpna, cyhxa);
- 14) **c7c10_ arom**=sum(mpxy, oxyl, metolu, petolu, oetolu, _135tmb, _124tmb, _123tmb, tolu, ebenz, ispbz, npbz, mdebz, pdebz, styr);
- 15) **c7c11_ other**=sum(mcyhx, _24dmp, _2mhxa, _23dmp, _3mhxa, nhept, _224tmp, _234tmp, _2mhpep, _3mhpep, noct, nnon, ndeca, nudeca);

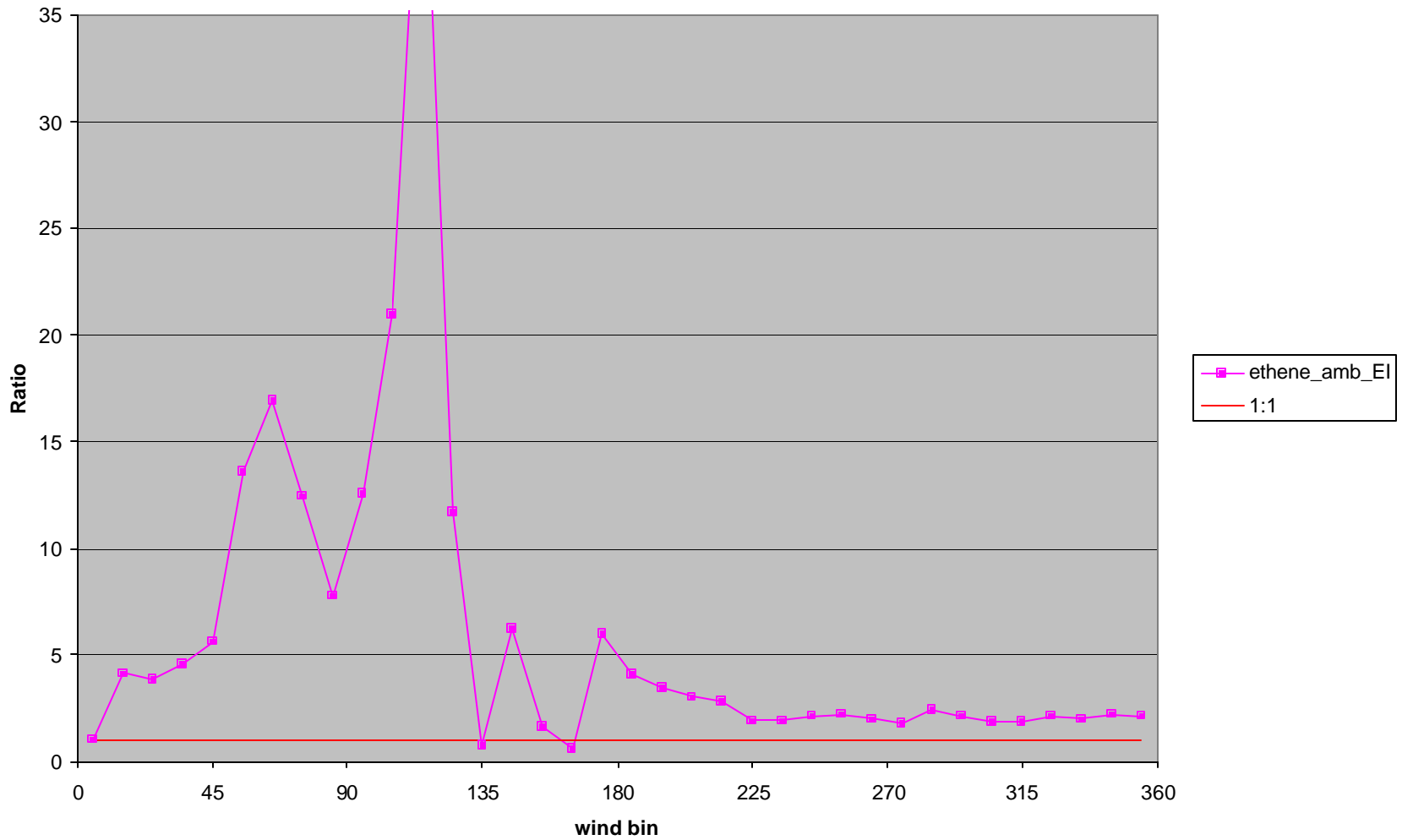
Non-Point Source NOx Emissions in 9 Cells around Clinton

Gridded emissions assigned to pseudopoints



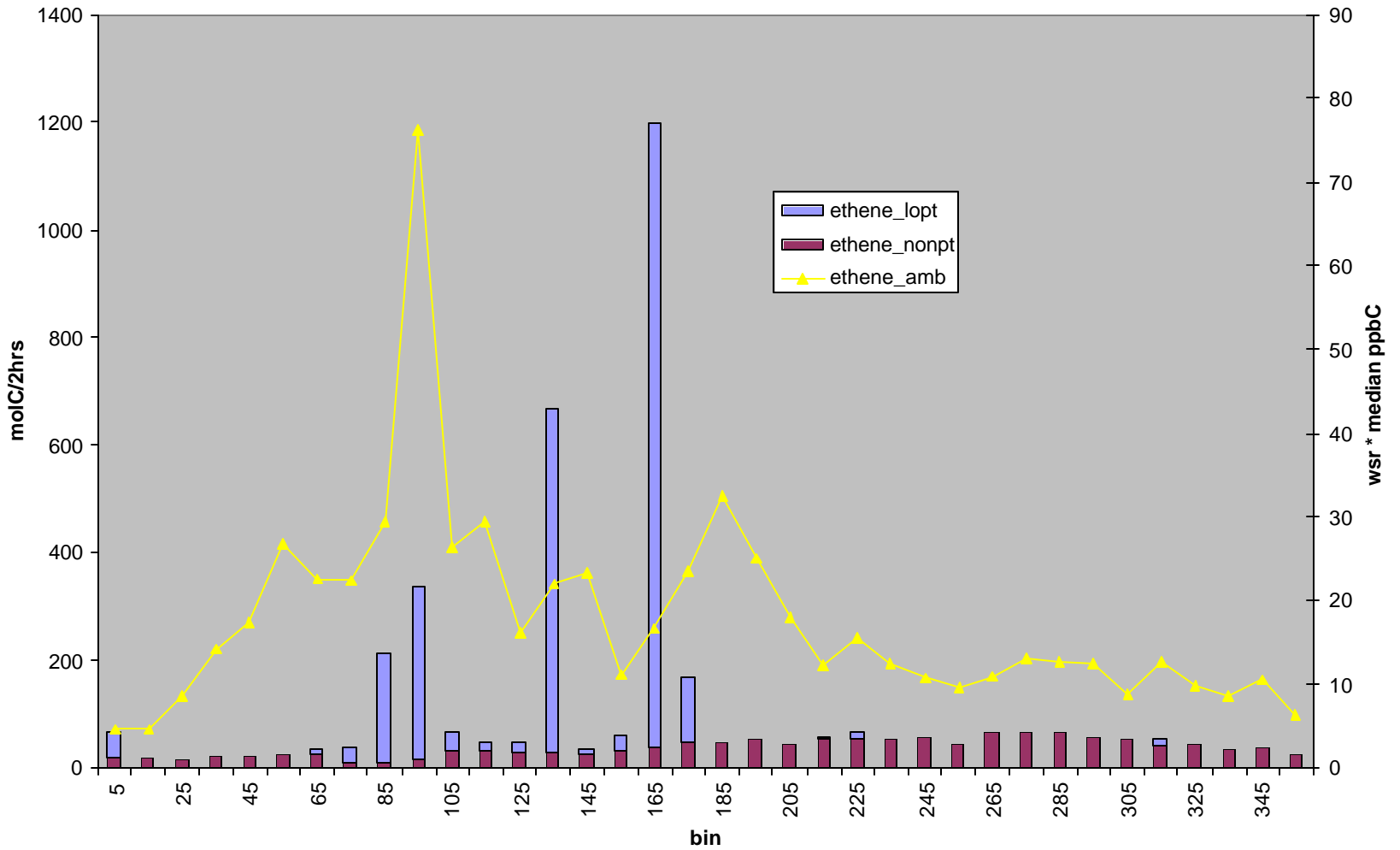


Ratio of Median Ambient ethylene:NOx to Non-Elevated EI ethylene:NOx at Clinton



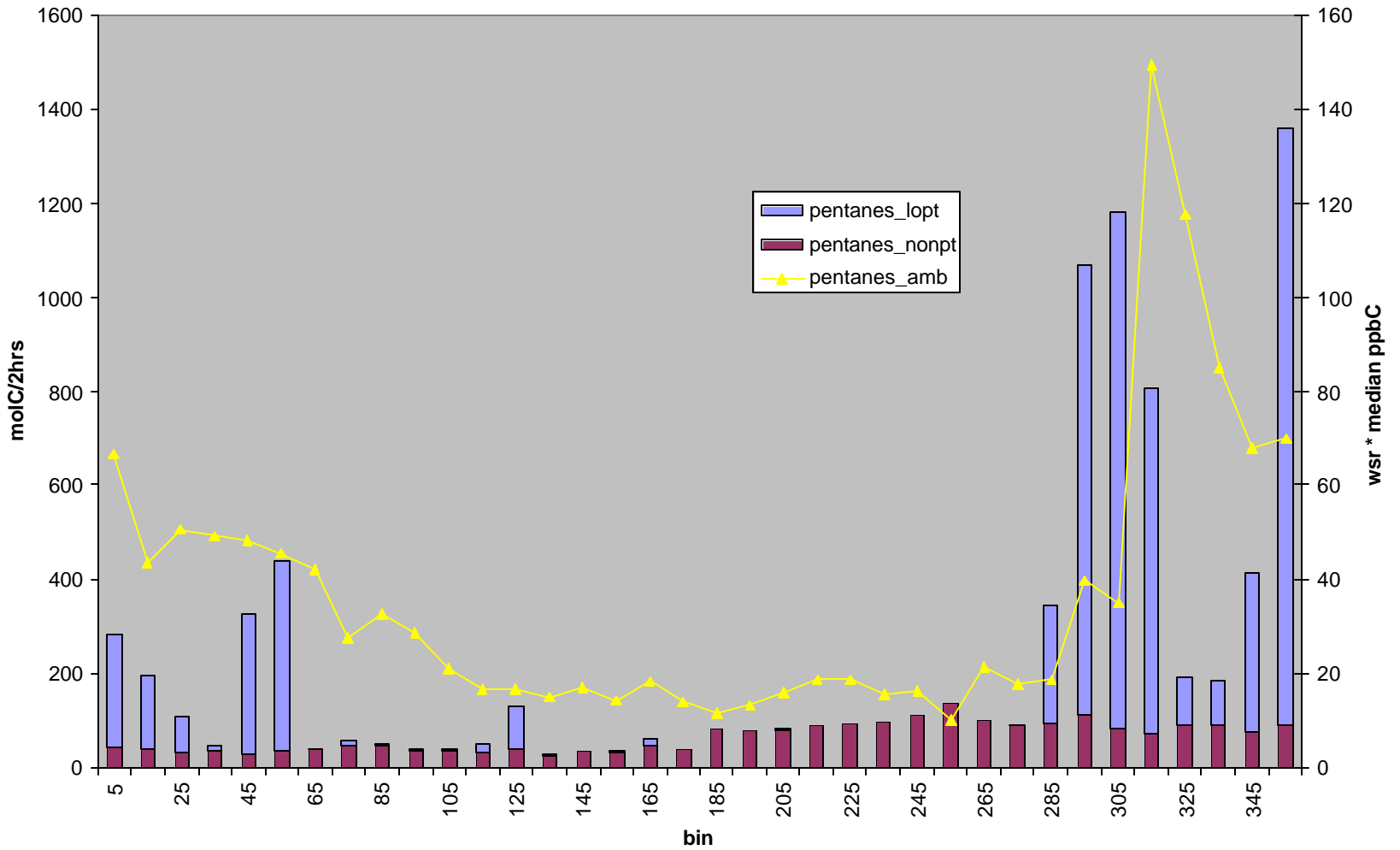
Clinton -- Median Ambient ethene versus Non-Elevated ethene Emissions

Ambient concentrations normalized for windspeed

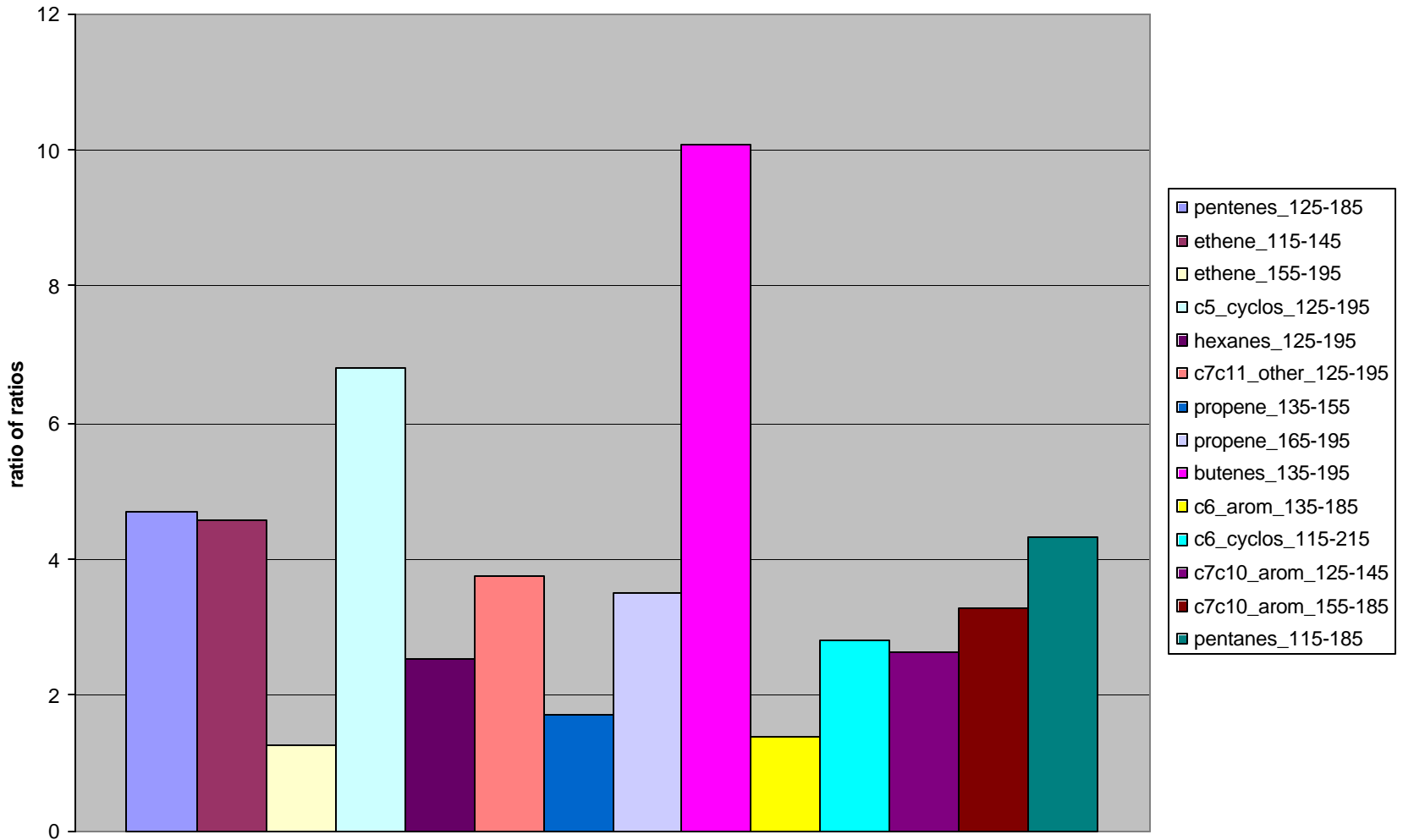


Deer Park -- Median Ambient pentanes versus Non-Elevated pentanes Emissions

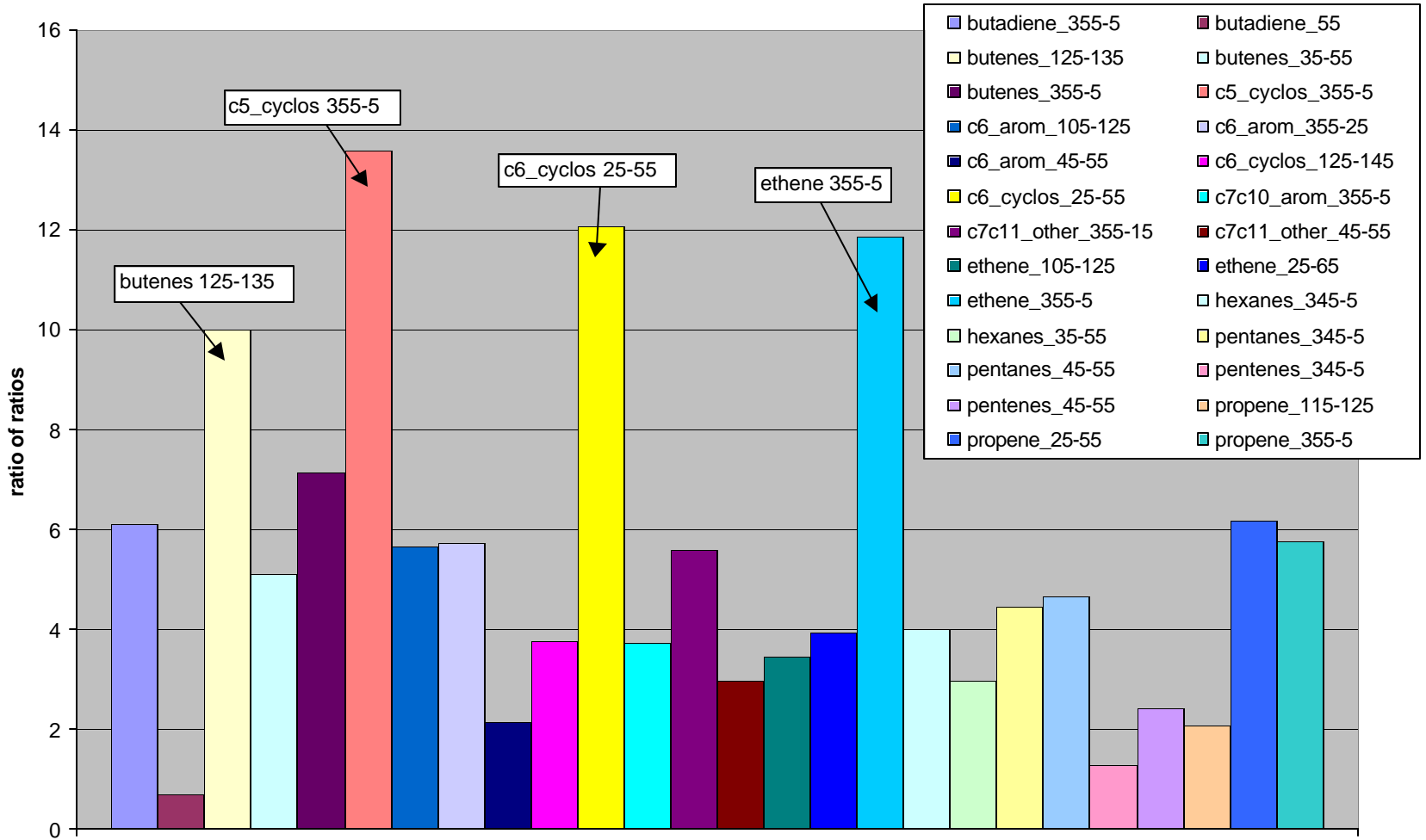
Ambient concentrations normalized for windspeed



Clinton -- Ratio of Ambient:EI VOC:NOx Ratios



Deer Park -- Ambient:EI Ratio of VOC:NOx Ratios





Conclusions

- Striking butenes disagreement to S-SE of Clinton suggests strong underestimation – very important reactivity component
- For many VOC groups, non-point sources contribute as much as point sources to southeast of Deer Park – warrants caution in applying adjustment factors to Bayport point sources
- Similarity at Clinton in bins 195-355, across VOC groups, suggests non-point inventory relatively accurate
- Butanes need to be studied further – disagreement in both non-point and point