

Ozone removal by Norway spruce forests: a case study in Trentino, North Italy

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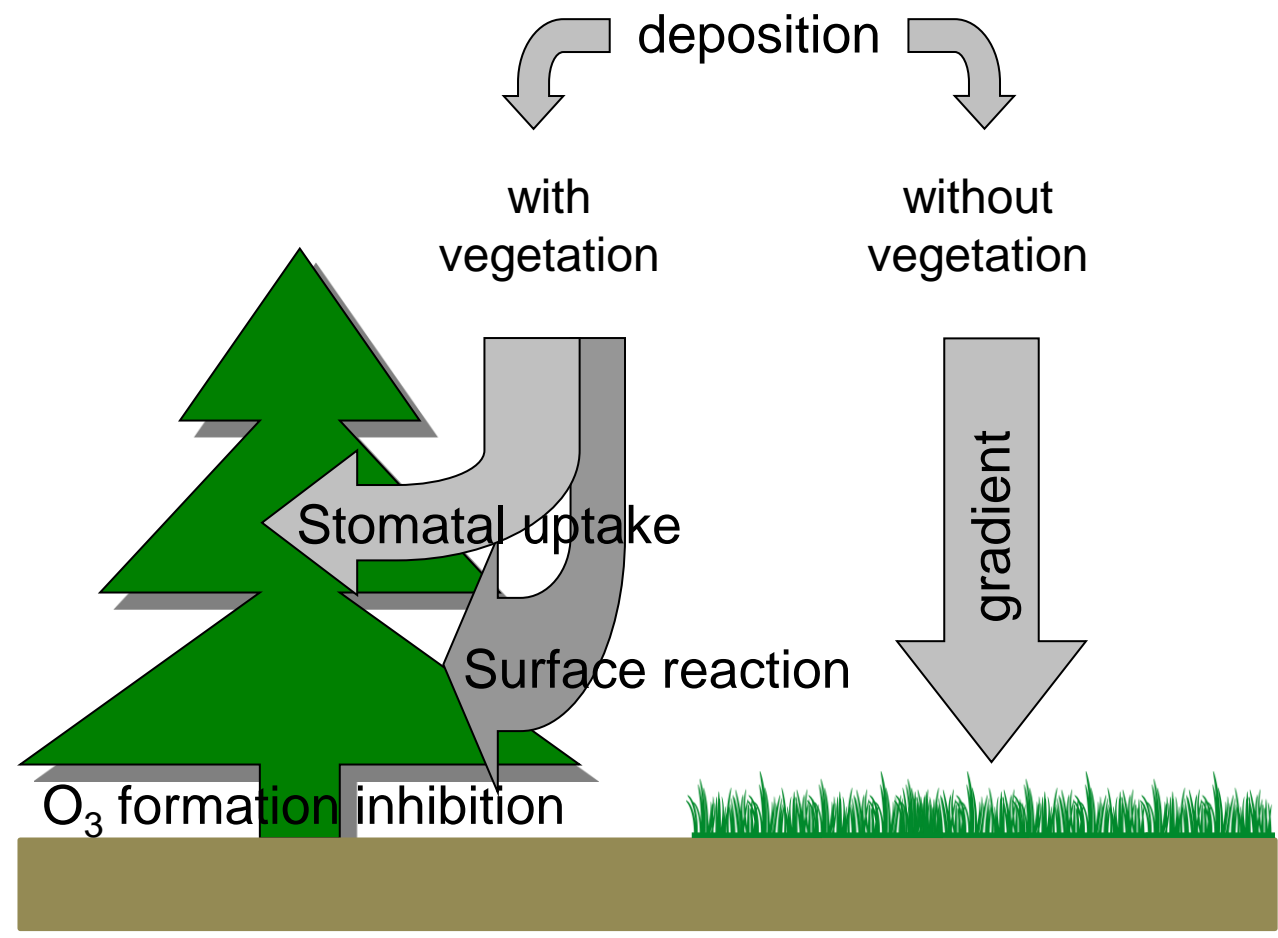
Ecosystem services

- Wood and non-wood products
- Biodiversity protection
- Water regulation and supply
- Soil protection
- Nutrients cycling
- Climate regulation
- Recreation/therapy
- **Pollution control**



Pollution control

O_3



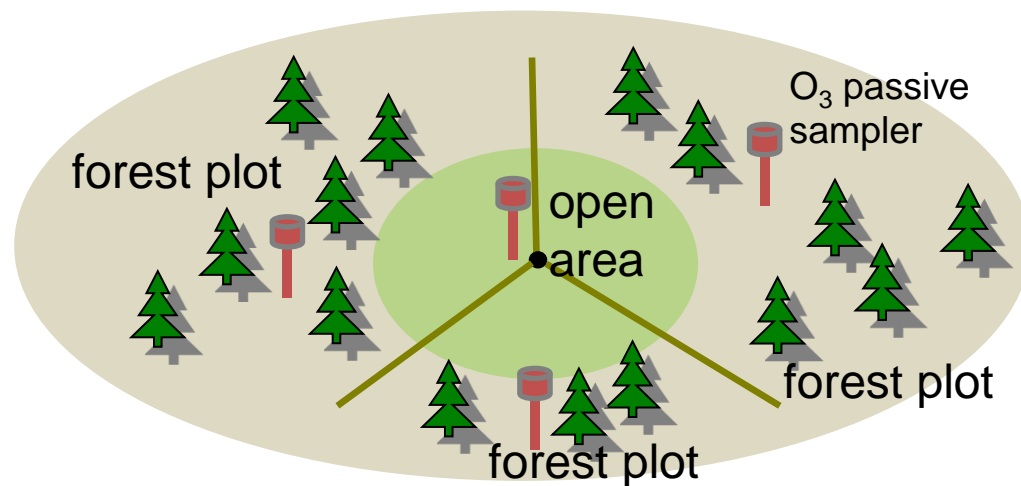
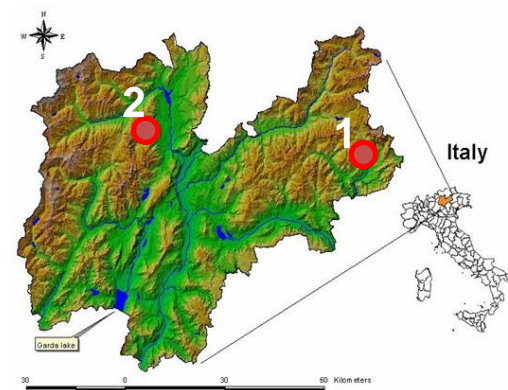
- Trentino, north Italy – 66% forests
- Two altitudinal transects
- Range: ~900 – 1700 m asl

- 3 altitudinal belts for each transect

<1000 m asl
 1000-1300 m asl
 >1300 m asl

- 1 open area + 3 forest plots

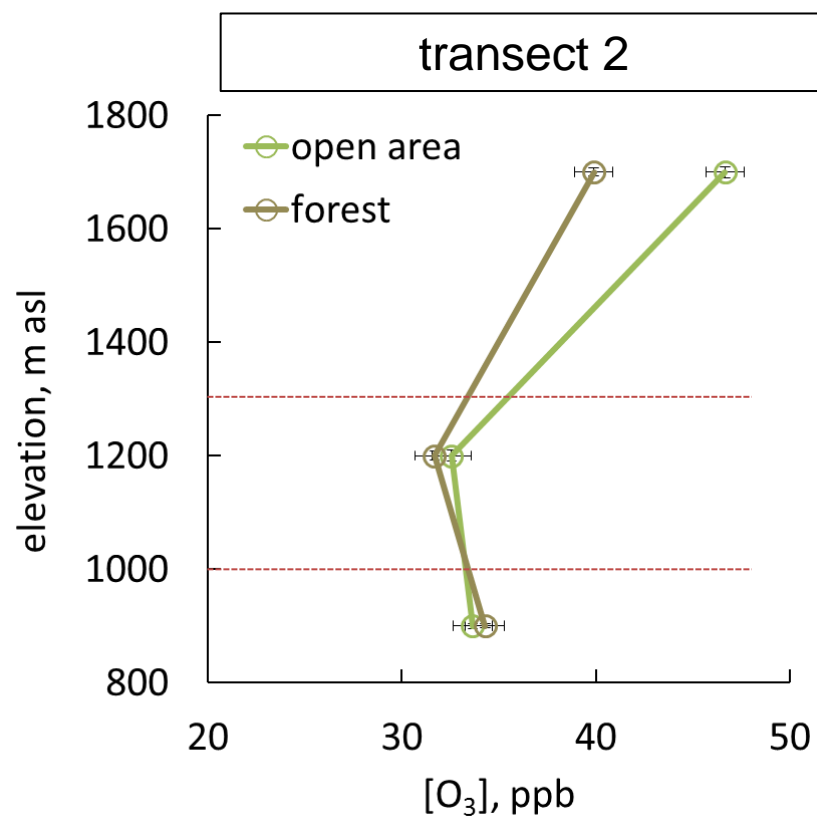
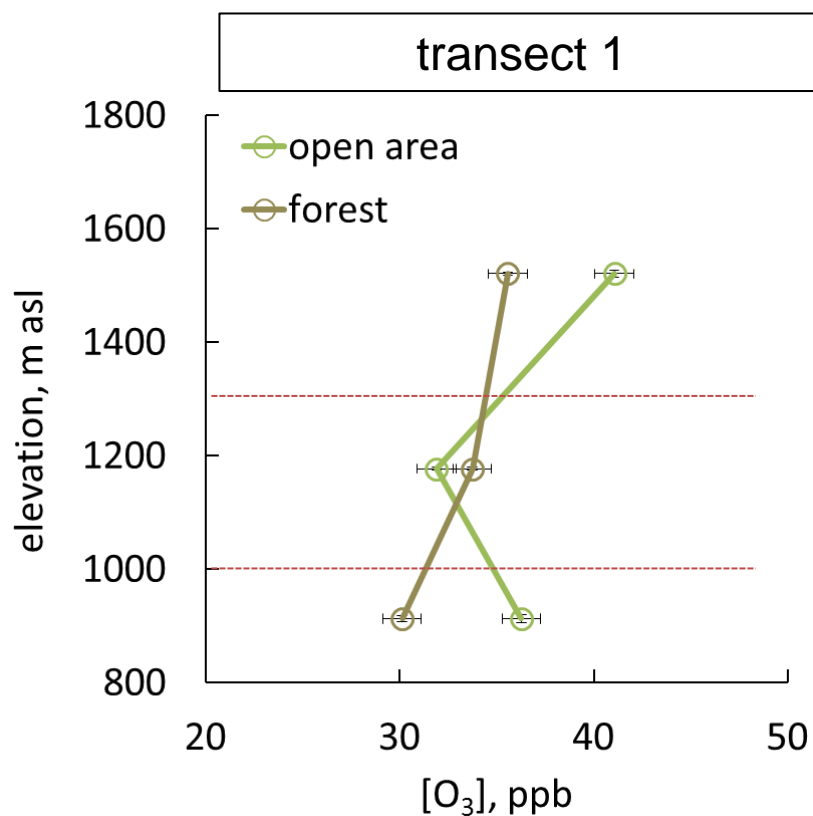
- [O₃] measurement: May-Sept (21 weeks)



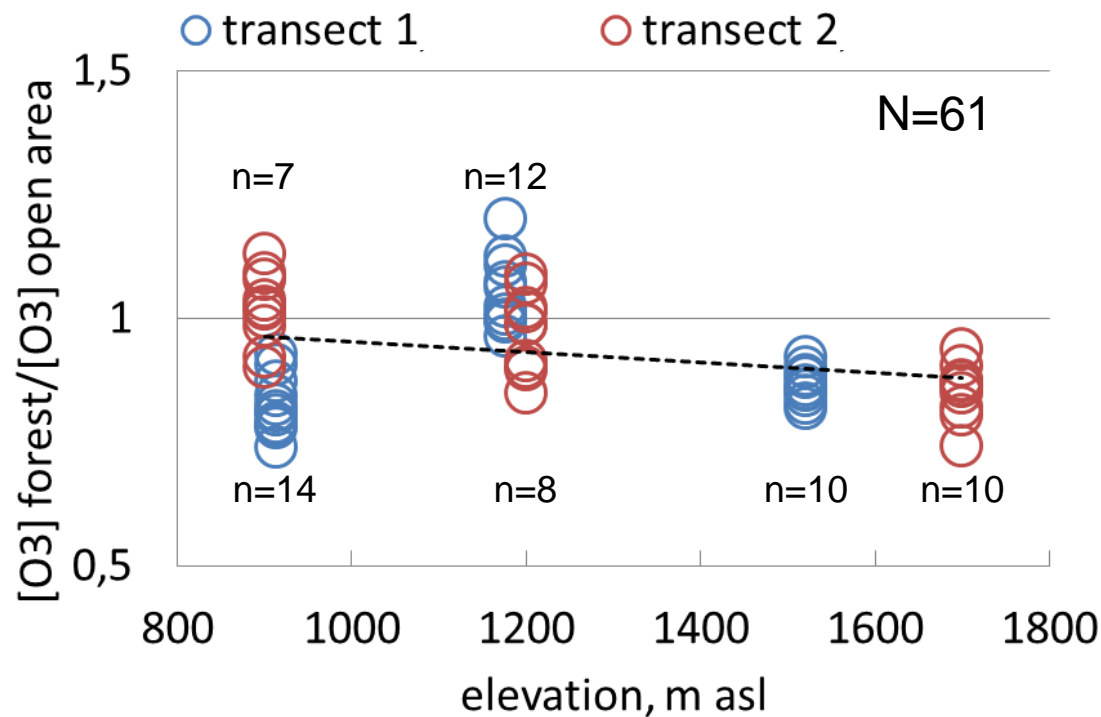
$[O_3]$ open area: 37.0 ± 7.6 ppb

$[O_3]$ forest: 34.2 ± 6.5 ppb

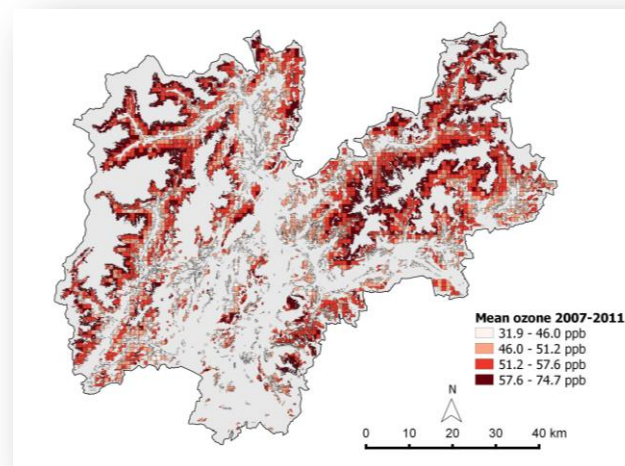
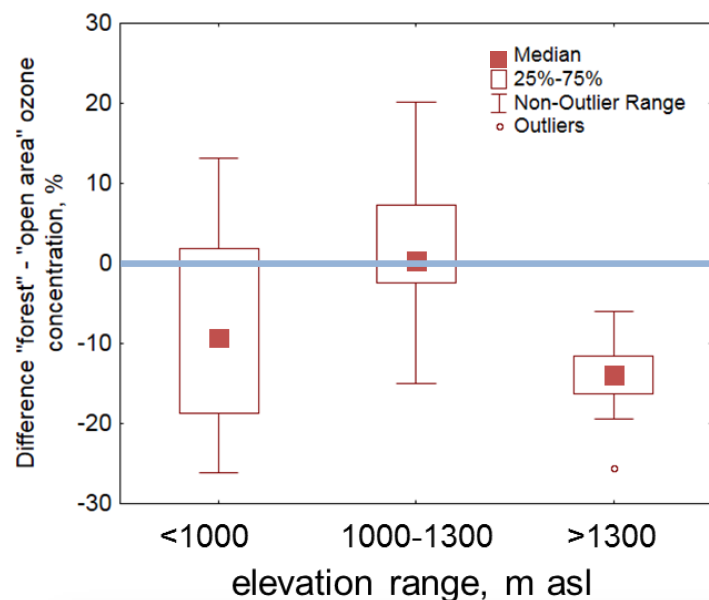
- Mean ozone concentration in forest significantly lower (-8%; $p < 0.01$) than in open area



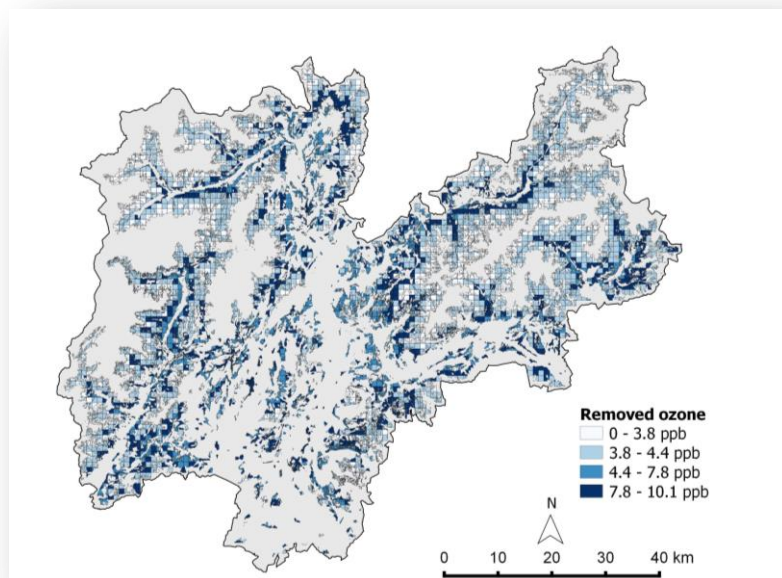
Weekly ratios between mean $[O_3]$ in forest sites and related open area along the two altitudinal transects



- $[O_3]$ in forest is lower than in open area, mostly at the highest elevations

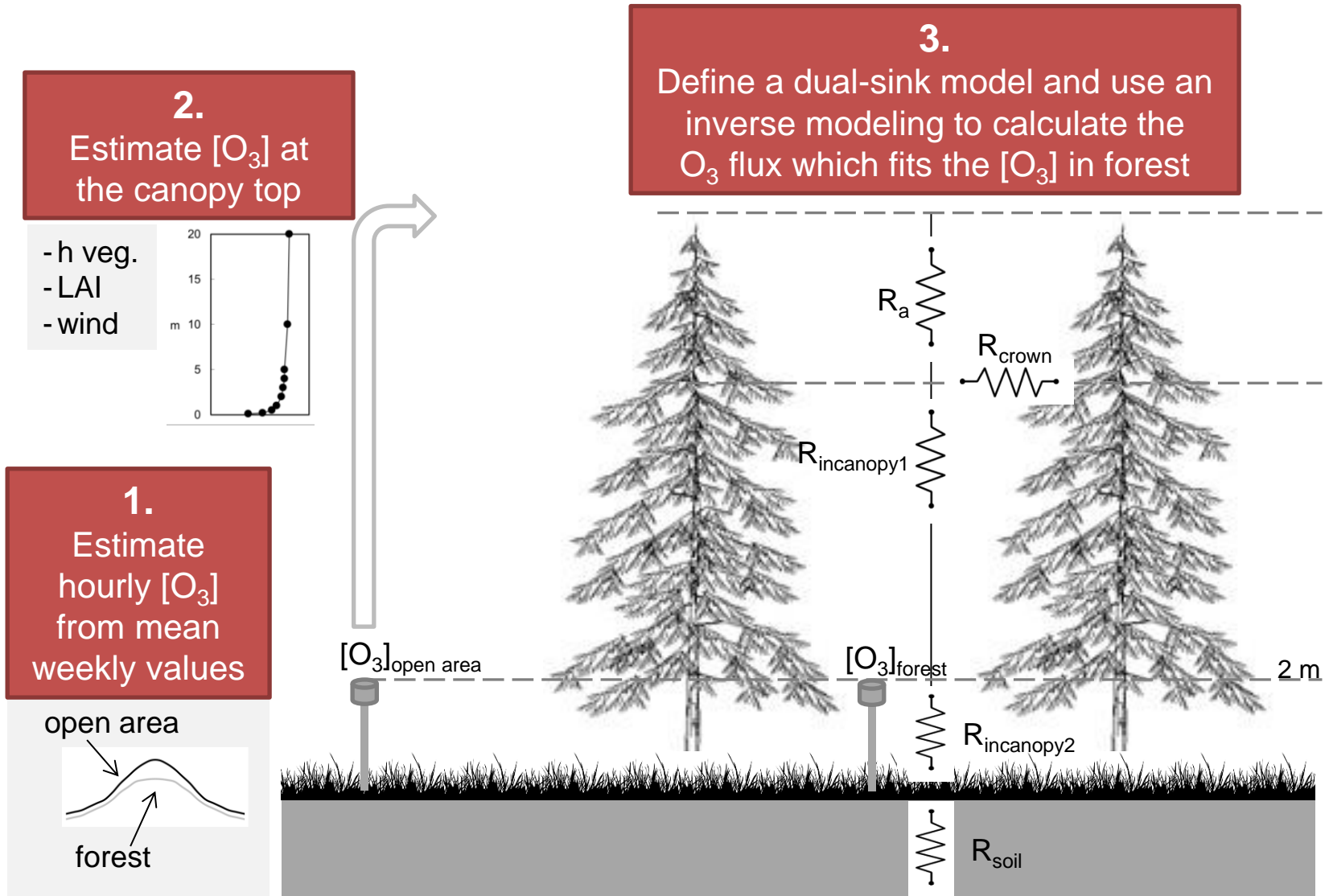


2007-11 mean $[O_3]$ estimated for all 1x1km cells (Cristofori et al, 2015) cutted for conifer forests



- on average -5ppb in forest
- 63% of conifer forests show a reduction of 4 to 10 ppb

Adopting a more complex approach: O_3 flux estimate



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- Measurements show a -8% of ozone in forest
- Reduction is more pronounced at high elevation sites
- Scaled up at regional scale, ozone in forests is 5ppb lower
- Pollutant removal by forests is important in this touristic region (~9.5 million tourists in summer 2017)
- Further analysis to understand the actual role of vegetation in ozone removal

Acknowledgments:

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Thanks for your attention