

# European forests in a changing environment:

## Air pollution, climate change and forest management



7<sup>th</sup> ICP Forests Scientific Conference  
22-23 May 2018 in Riga, Latvia

### Abstracts



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Abstracts

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Walter Seidling

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

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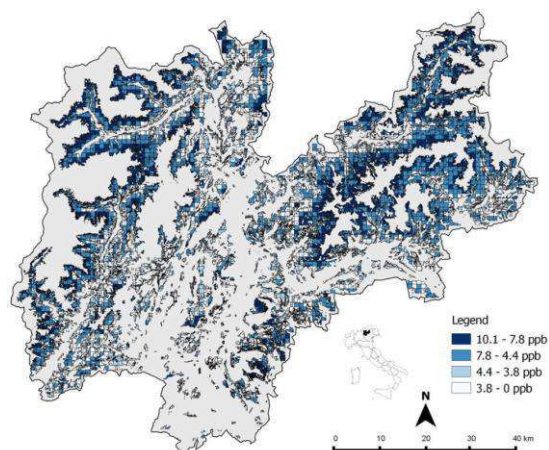
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Tropospheric ozone (O<sub>3</sub>) is absorbed by tree foliage and this may impact tree performance. Uptake by plants, however, may also result into removal of O<sub>3</sub> from the atmosphere, thus contributing to improved air quality. Such a removal should be reflected to some extent by reduced O<sub>3</sub> concentration [O<sub>3</sub>] beneath the forest canopy as compared to open areas. Given the peculiar spatial pattern of [O<sub>3</sub>] (higher in remote, high elevation sites and in summer time) and its high oxidative potential, [O<sub>3</sub>] reduction can be of particular importance in montane, remote areas subject to intense tourism during summertime.

Aim of this work is to estimate the contribution of Norway spruce forests to [O<sub>3</sub>] reduction in Trentino, North Italy, a 6200-km<sup>2</sup> alpine region covered for 56% by forests, subject to high [O<sub>3</sub>] (Gottardini et al. 2017) and visited by 9.5 million tourists in summertime.

We considered two elevation gradients (range: 900-1700 m a.s.l.) and measured [O<sub>3</sub>] at 2 m height in six open areas and in 18 nearby N. spruce forest stands according to Schaub et al. (2016) during summer in 2013 and 2016. We calculated the mean relative differences in [O<sub>3</sub>] between forests and open areas (%) for three elevation classes (<1000; 1000-1300; >1300 m a.s.l.). These % were then tentatively applied to the mean 2007-2011 [O<sub>3</sub>] previously estimated for open areas in the region (Cristofori et al. 2015) on a 1x1 km grid. First results show that [O<sub>3</sub>] in forest (mean=34.1±6.52 ppb) are significantly lower (p<0.001) than in the open areas (mean=37.0±7.61 ppb), especially at high elevation. When estimated for the entire conifer forests in the region (2140 km<sup>2</sup>), mean reduction of [O<sub>3</sub>] was 5.0 ppb (range 0-10.1 ppb). The largest portion of conifer forests (1408 km<sup>2</sup>) showed an expected reduction of [O<sub>3</sub>] between 4.4 and 10.1 ppb, as compared to open areas (Fig. 1).



**Figure 1:** Expected reduction of ozone by conifer forests in Trentino, north Italy. The four ozone classes represent the quartiles of the distribution and are expressed as absolute values.

### References

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