The Bodinggraben creek cuts deep into the limestone of Kalkalpen National Park.

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Kalkalpen National Park | AUSTRIA

The mountain forests of Europe are important habitats to preserve and manage. In addition to their ability to store carbon, acting as a "sink" for current and future carbon emissions, they are also biodiversity hotspots and provide areas of recreation and outstanding natural beauty. The Kalkalpen National Park in Austria is a prime example. The park contains Austria's largest forested area, characterized by mixed spruce-fir-beech forests, subalpine spruce forests, pastures and alpine habitats. Over 900 plant species are found here (one third of all plant species in Austria), along with one of the rarest mammals in Europe, the Eurasian lynx (Lynx lynx), which has been reintroduced into the park on several occasions.

Climate change is already altering mountain forest ecosystems across Europe, and will continue to do so. In the Kalkalpen National Park, higher temperatures are increasing the risk of bark beetle outbreaks and stronger winds are causing more damage. Certain tree species such as Norway spruce are dying faster than usual, and new tree species are taking their place. These kinds of disturbance release high amounts of carbon into the atmosphere and reduce the forest's capacity to retain pollutants such as nitrogen. On the other hand, forest disturbances can increase biodiversity by creating diverse habitats, with deadwood in particular constituting a key habitat for many typical mountain forest species.

Herein lies the challenge for politicians and managers of protected areas, who are faced with maintaining the forest's capacity to sequester carbon and filter pollutants such as nitrogen, while also allowing wilderness and its related plant and animal species to return.

The ECOPOTENTIAL project is supporting fact-based decision-making within the park in these times of rapid change. Ecosystem models, developed by the Karlsruhe Institute of Technology and the Environment Agency Austria, are used to assess the effect of storms and insect infestations on carbon loss to the atmosphere and nitrate loss to groundwater. At the same time, satellite data is

analysed to improve forest vegetation inputs to the model for the entire park area. In the near future, the models will be run with climate scenarios to evaluate potential future impacts. Model results will provide guidance as to how bark beetle and wind disturbance areas should be managed to optimize both carbon sequestration and biodiversity.
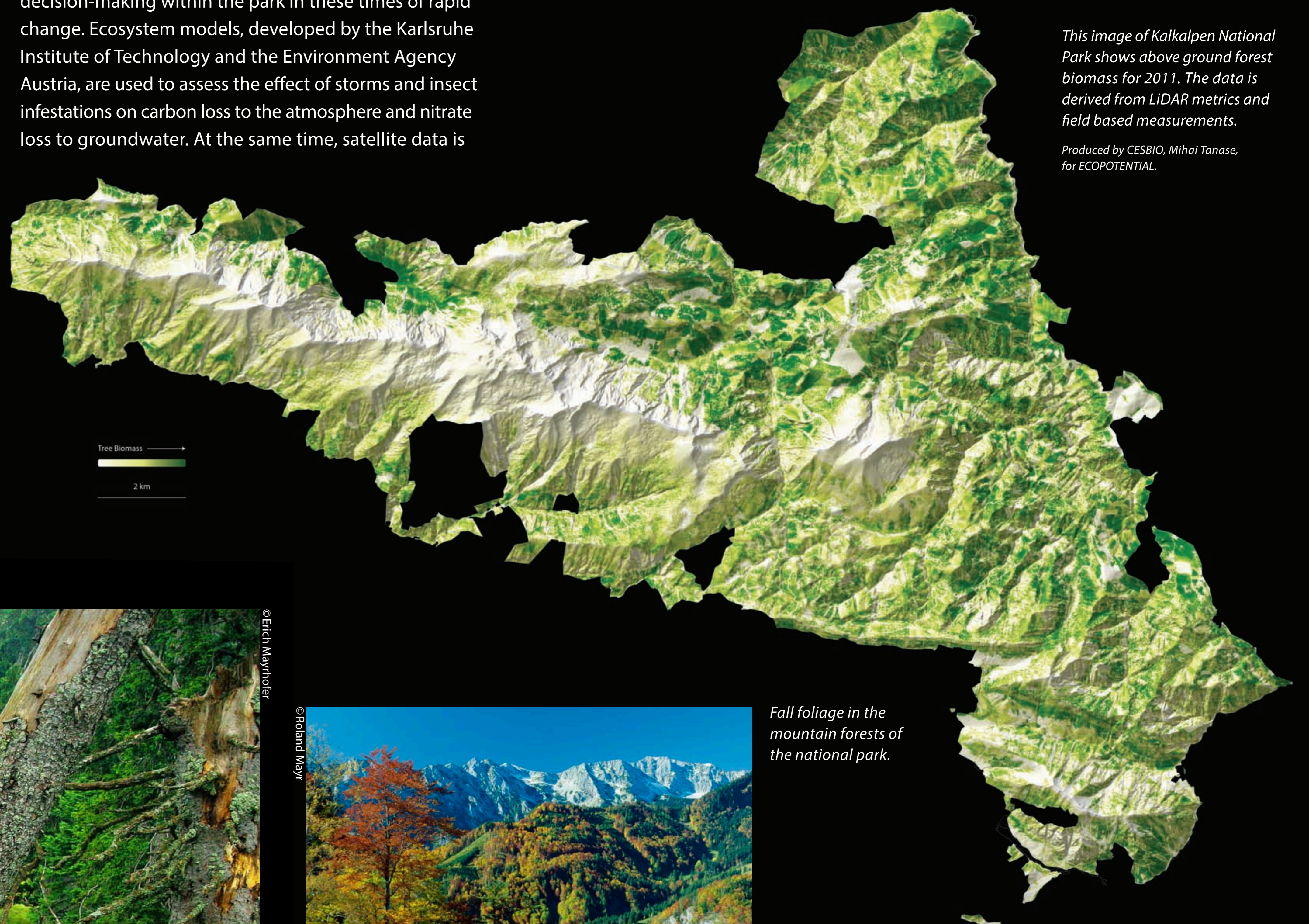
This image of Kalkalpen National Park shows above ground forest biomass for 2011. The data is derived from LiDAR metrics and field based measurements.

Produced by CESBIO, Mihai Tanase, for ECOPOTENTIAL.

Tree Biomass

2 km

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Fall foliage in the mountain forests of the national park.

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Eurasian lynx (Linx linx) family

Deadwood in the pristine Norway spruce forests of the national park.

Monitoring water in Kalkalpen National Park.

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