

## How does the emission of airborne particles affect the climate?

Almost 70 % of Sweden is covered by forests, in particular of commercially managed coniferous forests. Forests have a central role in regards to climate change, as they absorb carbon dioxide but at the same time they release greenhouse gases and reactive hydrocarbons. Many of these hydrocarbons have shown to have a cooling effect on the climate as they produce and affect the amount of secondary organic atmospheric particles (SOA) in the air. SOA contribute to the production of clouds, which have a cooling effect on the climate by reflecting more incoming sunlight. With global warming, the cooling effect by atmospheric particles is expected to increase as more hydrocarbons are produced and released by the coniferous trees. However, there exists a limited understanding for the current feedback mechanisms due to the restricted amount of studies performed on coniferous trees.

Recently two projects have received grants aiming to increase our understanding of how reactive hydrocarbons from Swedish spruce forests and atmospheric particles affect our climate. The first project is a FORMAS-grant which has been given to Professor Janne Rinne at the department of Physical Geography and Ecosystem science. The aim of the project is to perform measurements on an ecosystem level of the reactive hydrocarbons from spruce in order to increase the understanding of what are typical emission patterns for spruce in Sweden. The other project has been granted to Adam Kristensson at the division of Nuclear Physics and ACTRIS, financed by the Royal Physiographic Society of Lund and from the Erik and Märta Holmberg donation. Within ACTRIS, airborne particles and short-lived gases are measured at different stations within Europe and are on their way to become an 'ERIC'-infrastructure ([www.actris.eu](http://www.actris.eu)). The aim for this project is to install measurement equipment in a 30 meter tower, which makes it possible to perform advanced gas- and particle measurements and study the exchange between trees and the atmosphere.

Both projects aim to do measurements at measurement stations which Lund University and Stockholm University operate, namely Hyltemossa outside of Perstorp in Scania and Norunda outside of Uppsala in Uppland. Both stations are part of the European infrastructure ICOS ([www.icos-sweden.se](http://www.icos-sweden.se)), which have been appointed by EU as a prioritized 'ERIC'-infrastructure. The cooperation between ACTRIS and ICOS at Hyltemossa is considered to be important, as the cooperation provides with more advanced experimental set-ups and potentially an increased understanding of the effect coniferous forests has on climate change. The granted funding from the Royal Physiographic Society of Lund will additionally ensure that Hyltemossa becomes one of the world's few flagship stations. A flagship station provides with top modern measurements and data of the flow of airborne particles between the atmosphere and biosphere.

For more information, contact:

**FORMAS:** 'Mot full förståelse av boreala skogar som en del av klimatsystemet: Rollen av biogena flyktiga organiska föreningar'

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**How do reactive hydrocarbons released from a spruce forest affect the climate?  
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