Innovative Forest Fire Early Warning System: Hydrogen-based fire detection

Jürgen Müller¹ · Werner Moritz² · Kai Nörthemann² · Jan-Eric Bienge¹
¹ Thünen-Institute of Forest Ecosystems, ² Humboldt Universität Berlin

Background and main objectives

During a typically dry Spring in Brandenburg a forest fire starts. Valuable timber is lost, people and animals are threatened. In 2003, a dry year, forest fires in Brandenburg resulted in damage totalling more than EUR 1 million.

The existing Fire Watch System can only identify fires when intensive smoke is being developed, monitoring can be considerably impeded by landscape contours and other factors.

Therefore tests are being carried out on a hydrogen sensor developed at the Humboldt University Berlin which can be used to detect forest fires in the early stages, before open flames are formed.

Results – Sensor testing in the field

Method

Principle

- The pyrolysis (thermal transformation) of organic material releases hydrogen (H₂).
- H₂ molecules are small enough to penetrate the lattice structure of the detector and cause of change in capacitance.
- H₂ is a selective pyrolytic product, and suitable as an early indicator of forest fires.

Outlook

In view of changing climate conditions, the warning system is an important early warning and monitoring module for the protection of forests.