How tree disease impact rapidly the biogeochemical cycle of some elements in soil solutions until return to a new balance (Strengbach Catchment, France).

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During the summer 2013, a spruce plot was strongly attacked by parasite (bark beetle) leading to the fall of all the bark and then trees mortalities.
Located on the Strengbach catchment, this plot was monitored by sampling and analyses of throughfalls and soil solutions at four different depths (5, 10, 30 and 60 cm). The throughfalls are sampled and analysed bi-weekly and the soil solutions each 6 weeks, since 2004. The data allow studying the chemical compositions for 13 years, in relation with the different modifications of the plot, including the perturbations due to beetle attack. The impacts on the chemical compositions of many elements in soil solutions were very fast and simultaneously at the 4 depths.
Nitrate export increased significantly and rapidly after the event because of reduction of plant uptake combined with the increase of nitrification and N mineralization.
Some major cations as Mg, Ca, Al, as well as Sr, Ba and Mn were released in relation to increase acidity and cationic exchanges. We observed a large increase of sulphate concentration only at 60 cm depth, which can be related to an increase of sulphate anionic desorption, due to pH decrease.
The chemical variations reached their maximums at summer/fall 2015 and their initial values after 4 years, highlighting the capacity of natural system to absorb perturbations.