20 years of forest change in Natura 2000 protected areas network

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Natura 2000 network, the world's largest network of protected areas, is considered a success for habitat and biodiversity protection, in the last decades. Our objective is to develop an algorithm for satellite data temporal analysis of protected areas, and to apply subsequently this algorithm for analysis of all Natura 2000 sites in Europe. We have developed an algorithm for satellite data temporal analysis of protected areas using JavaScript in Google Earth Engine, which is a web interface for the massive analysis of geospatial data, providing access to huge amount of data and facilitating development of complex workflows. This work focused on analysis of Global Forest Change dataset representing forest change, at 30 meters resolution, globally, between 2000 and 2018. Our results show that at least regarding forest protection, the network is not very successful, the 25350 sites losing 35246.8 km$^2$ of forest cover between 2000 and 2018, gaining only 9862.1 km$^2$. All 28 countries recorded a negative forest net change, with a mean value of -906.6 km$^2$, the largest forest area change recording Spain (-5106.4 km$^2$ in 1631 sites), Poland (-4529 km$^2$ in 962 sites), Portugal (-2781.9 km$^2$ in 120 sites), Romania (-1601.4 km$^2$ in 569 sites), Germany (-1365.7 km$^2$ in 5049 sites) and France (-1270.9 km$^2$ in 1520 sites). Among countries with the lowest values in net forest change is Ireland (-17.4 km$^2$ in 447 sites), Estonia (-104.1 km$^2$ in 518 sites), Netherlands (-132.3 km$^2$ in 152 sites), Finland (-268.6 km$^2$ in 1722 sites) and Sweden (-341.6 km$^2$ in 3786 sites).