



Acronym	FlyForSIF
Full Title	Forest Stress detection using single-tree hyperspectral reflectance and solar induced chlorophyll fluorescence (SIF)
Partner(s)	Fondazione Edmund Mach, Italy (<i>coordinator</i>) Consiglio Nazionale delle Ricerche con sede legale in Roma, Italy University of Milano-Bicocca, Italy Global Change Research Institute CAS – CzechGlobe, Czech Republic
Grant Theme	Pilots of long-term climate impact forest monitoring sites: Linking stand-level information and remote sensing
Start Date	April 2025
Duration	18 months
Description	FlyForSIF combines hyperspectral and solar-induced chlorophyll fluorescence airborne measurements to determine tree stress responses along a stress severity axis, to upscale current and possible future climate impacts on forests. A biogeographical west-European transect including three super-sites (in forest ecosystems which are showing mild to severe signs of decline) was designed including: • Mediterranean evergreen oak forests, • Continental deciduous oak forests, • Low altitude alpine pine forests. Ground-truth data available at the selected super sites (Eddy Covariance, defoliation, sap flow, canopy hyperspectral reflectance and SIF) will be integrated with additional FlyForSIF measurements (airborne SIF, Leaf Area Index, Leaf Water Content, Specific Leaf Area, leaf pigment content and leaf Pulse-Amplitude-Modulation-PAM fluorescence). Pigments (including xanthophylls) are measured at selected trees during the summer of 2025. Flight campaigns are carried out with IBIS-CASI-SASI hyperspectral sensors. The ability of single-tree spectral information to detect tree stress is tested and upscaled to the satellite level using PlanetScope imagery. In the FORWARDS project context, the expected results will act as a proof of concept for the future implementation of a multi-scale tool for long-term detection of climate change impacts on European forests.



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