PEPR FairCarboN / PC3 / "RIFT" (2023-2027): a project to strengthen and develop Eddy-Covariance infrastructures in agroecosystems of the Tropics and the Mediterranean (2023-2027)

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1/ Program:

The PEPR (Programme et équipements prioritaires de recherche) exploratory FairCarboN project (2023-2027) funded by the Agence Nationale de la Recherche (ANR-France) aims to study continental ecosystems to identify levers and trajectories for carbon neutrality

2/ Countries and Ecosystems:

Beneficiary countries and partners are from North Africa (Morocco and Tunisia), Sub-Saharan and Central Africa (Senegal, Niger, Benin and Cameroon), South America (French Guiana and Brazil) and India. Sites cover a wide range of natural and agro-ecosystems, including mixed-forest plantations (Brazil).

Site country (location)	Systems/Ecosystems	Current state
Benin (Belefougou)	Forestry and Cropping (2 stations)	Operational
Brazil (Mata flux)	Forestry/Eucalyptus (1 station)	Operational
Cameroun	Forestry/Wet forest (1 station)	Under consideration
Cameroun (Cacao flux)	Agroforestry/Cocoa (1 station)	In progress
French Guiana (CARPAAG)	Pasture/Wet meadow (1 station)	In progress
India (Mule Hole)	Forestry (1 station)	In progress
Morocco (Tensift)	Agriculture/Rainfed wheat (1 station)	Operational
Niger (Wankama)	Agropastoral/Crop- and fallow lands (2 stations)	Operational
Senegal (Niakhar)	Agroforestry Bushland/Millet-peanut rotation (2 ECs - high- and low-pass)	Operational
Senegal (Niakhar-Sob)	Agriculture/small plots (1 low-pass EC)	In progress
Senegal (Niakhar-Ragola)	Agroforestry Bushland/Millet-peanut rotation (1 low-pass EC)	Operational
Tunisia (Kamech)	Agriculture (1 station)	Operational
Tunisia (Taous)	Orchard/Rainfed olive plantation (1 station)	Operational
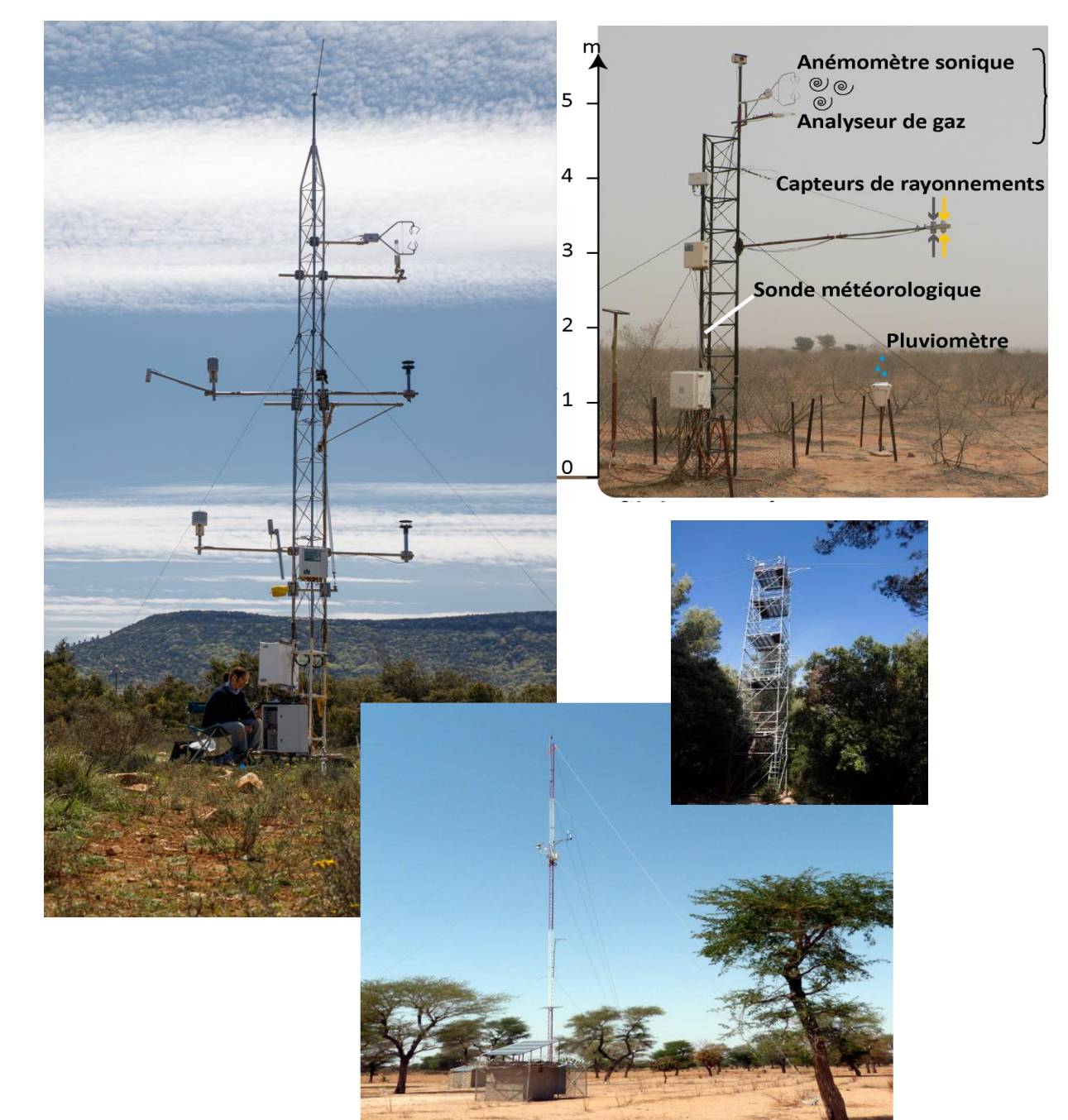
3/ RIFT project:

The Targeted Project 3 **RIFT** is the part of the FairCarboN programme dedicated to strengthening the infrastructure for monitoring GHG fluxes at the soil-vegetation-atmosphere (SVA) interface, commonly known as "Flux Towers". These towers are an essential element in the assessment of carbon fluxes in agroecosystems. The project offers a set of activities combining measurements of different surface fluxes (energy/water/carbon), related observations (e.g. in-situ remote sensing) and studies of the variables and mechanisms that drive these fluxes. The network consists of about 13 sites located in the mediterranean and tropical zones where the density of flux towers is low and those areas are under-sampled if one considers global databases such as FLUXNET. It involves measurement specialists as well as modelers, ecophysiologists and hydrologists (~60 participants). The specifications require the continuity of the measurements over 5 years, with a minimum cohort of measurements on each site and specific measurements on certain sites. One of the main objectives is to increase the skills and autonomy of the network's local partners through technical support and training sessions.

4/ Work Packages:

WP1 is dedicated to data acquisition and dissemination (protocols, metrology, post-processing, diagnostics, gap filling, archiving, etc.). **WP2** characterizes and quantifies the various processes, for each site and in cross-site analysis: net primary productivity, soil carbon balance, respiration, as well as the associated ecosystem indicators (Carbon Use Efficiency, Water Use Efficiency, etc.). **WP3** implements, compares and improves existing dynamic functioning models that generate time series of key observed or intermediate variables (water status, heterogeneity, etc.). **WP4** focuses on remote sensing observables, from the evaluation of existing "off-the-shelf" products to multi-sensor multispectral models that can be used to restore spatial variability and ensure the transfer of scale between different resolutions. It is based on local in-situ measurements (remote sensing, drones).