

THE FRENCH NETWORK OF ECOSYSTEMS STATIONS.

Sébastien Lafont¹, Tiphaine Tallec², Damien Bonal³, Eric Ceschia², Abad Chabbi⁴, Sébastien Conil⁵, Eric Dufrene⁶, Sébastien Garrigues⁷, Roland Huc⁸, Richard Joffre⁹, Katja Klumpp¹⁰, Bernard Longdoz³, Benjamin Loubet¹¹, Bruno Mary¹², Denis Loustau¹, (1) ISPA, INRA ; (2) CESBIO, CNRS/CNES/UPS/IRD ; (3) EEF, INRA; (4) URP3F, INRA; (5) ANDRA; (6) ESE, Université Paris Sud; (7) EMMAH, INRA; (8) URFM, INRA; (9) CEFÉ, CNRS; (10) UREP, INRA; (11) EGC, INRA; (12) AGROIMPACT, INRA

Denis.loustau@bordeaux.inra.fr

The Ecosystem station network of ICOS is based on a number of observation sites for monitoring and understanding the functioning of ecosystems and the exchange of energy and greenhouse gases between the ecosystems and the atmosphere in relationship with climate and management. It is using standardised instruments to perform continuous and intensive measurements of greenhouse gases concentration, meteorological and micrometeorological variables according to common protocols.

ICOS France is co-operated by INRA and CNRS. The network includes eight observation sites (4 class-1, 5 class-2) and seven associated sites. The network samples a range of ecosystems (forest, crop and grassland), management and climate (from cold mountain climate, to tropical humid in Guyana, and including wet oceanic and dry Mediterranean climate).

The French ICOS ecosystem branch involves the following:

- Heading committee** led by CNRS INSU and including INRA, CNRS INEE, CNES, Météo-France, UVSQ, French Research Ministry.
- Annual General Assembly** gathering all the sites PIs (last held in July 2014 in Paris)
- Instrumentation database** documenting the life cycle each sensor and data logger (calibration, maintenance and repair operations...).

The screenshot shows a search results page for instruments. The search term is "72H-0184". The results table includes columns for Type, Marque, Modèle, Numéro de série, Statut, Géolocalisation, Note / description, and Action. The results show five entries, each with a small thumbnail image of the instrument.

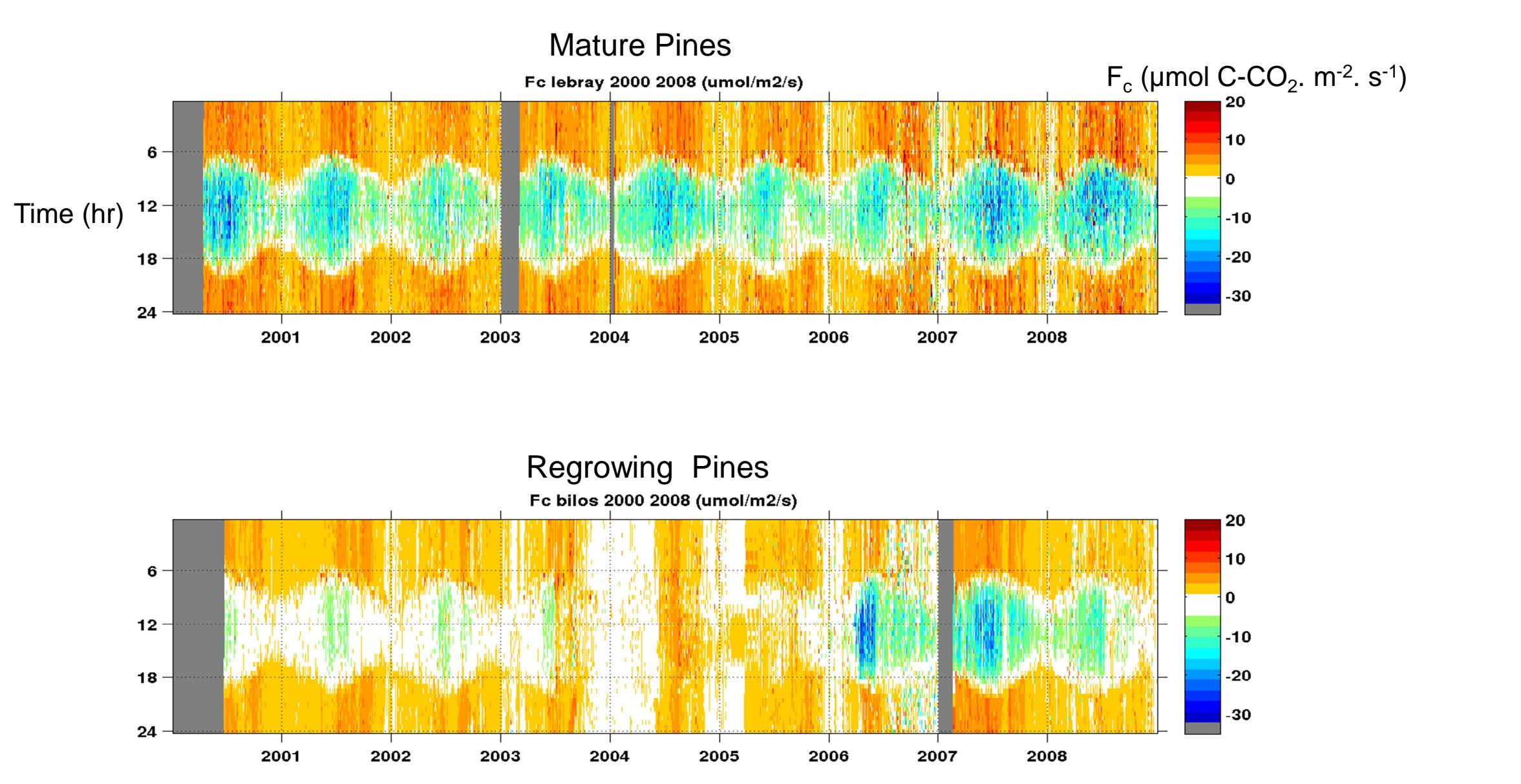
- Type: IRGA circuit fermé; Marque: LiCor; Modèle: LI-7200; Numéro de série: 72H-0184; Statut: utilisé; Géolocalisation: ICOS GIRONON; Note / description: L'analyseur IRGA LI 200 num de serie 72H-0184 fait partie d'un système d'échantillonnage à deux étages d'accès.
- Type: IRGA circuit fermé; Marque: LiCor; Modèle: LI-7200; Numéro de série: 72H-0184; Statut: utilisé; Géolocalisation: ICOS NANCY; Note / description: L'analyseur IRGA LI 200 num de serie 72H-0184 fait partie d'un système d'échantillonnage à deux étages d'accès.
- Type: IRGA circuit fermé; Marque: LiCor; Modèle: LI-7200; Numéro de série: 72H-0182; Statut: utilisé; Géolocalisation: ICOS LAQUEUILLE; Note / description: L'analyseur IRGA LI 200 num de serie 72H-0182 fait partie d'un système d'échantillonnage à deux étages d'accès.
- Type: IRGA circuit fermé; Marque: LiCor; Modèle: LI-7200; Numéro de série: 72H-0185; Statut: utilisé; Géolocalisation: ICOS BILOS; Note / description: L'analyseur IRGA LI 200 num de serie 72H-0185 fait partie d'un système d'échantillonnage à deux étages d'accès.
- Type: IRGA circuit fermé; Marque: LiCor; Modèle: LI-7200; Numéro de série: 72H-0186; Statut: utilisé; Géolocalisation: ICOS CHAPEAUX; Note / description: L'analyseur IRGA LI 200 num de serie 72H-0186 fait partie d'un système d'échantillonnage à deux étages d'accès.

Typical tower setup :

Type of measurement	Provider	Model	Variable
Sonic anemometer	Gill	HS-50	3D Wind speed components
Infra red gas analyser	LiCor	Li7200	CO ₂ , H ₂ O concentration (fast)
Infra red gas analyser	LiCor	Li840	CO ₂ , H ₂ O concentration (slow)
Sonic anemometer	Gill	WindSonic	2D anemometer
Capacitive sensor	Vaisala	HMP155A	Air humidity
Thermocouples network on plates	HukseFlux	HFP01SC	Soil heat flux
Thermopile sensor	Kipp & Zonen	CMP22	Global radiation
Thermopile sensor	Kipp & Zonen	CNR4	Net radiation
Sensible photodiodes	Kipp & Zonen	PQS1	Incoming and reflected PAR
Sensible photodiodes	Delta T	BF5	Diffuse and direct PAR, Sun duration
Sensible photodiodes	Proprietary	NDVI sensor	NDVI
Sensible photodiodes	Skye	PRI	Incoming and reflected
Self-calibrated dew-point ventilated hygrometer	Thygan	VTP37	Air dew point temperature

Results expected: Long time series of fluxes over ecosystems for determining effect of climate change and agricultural management.

Diagram below exemplifies a 9-year time series of CO₂ fluxes measured using past technologies over a mature and a juvenile pine stands. The uptake of carbon by the vegetation is represented by cold colours. Warm colours means that the vegetation is a source of carbon. Data obtained during the European projects Euroflux, Carboeuroflux, CarboEurope, Carbo Age, GHG-Europe)



Name	PFT	ICOS Class	Latitude	Longitude	Elevation	Institute	Pis	Email PI
Lamasquère	Crop	1	43.50	1.24	180	CNRS	E. Ceschia	eric.ceschia@cesbio.cnrs.fr
Hesse	Forest	1	48.68	7.07	300	INRA	B. Longdoz	longdoz@nancy.inra.fr
Barbeau	Forest	1	48.48	2.78	95	CNRS	E. Dufresne	eric.dufrene@ese.u-psud.fr
Laqueuille	Grassland	1	45.64	2.74	1040	INRA	K. Klumpp	katja.klumpp@clermont.inra.fr
Auradé	Crop	2	43.55	1.11	242	CNRS	E. Ceschia	eric.ceschia@cesbio.cnrs.fr
Salles	Forest	2	44.75	-0.78	58	INRA	D. Loustau	denis.loustau@bordeaux.inra.fr
Puechabon	Forest	2	43.74	3.60	250	CNRS	R. Joffre	Richard.joffre@cefe.cnrs.fr
Montiers	Forest	2	48.53	5.27	360	ANDRA /INRA	S. Conil	Sebastien.Conil@andra.fr
Lusignan	Grassland	2	46.42	0.12	152	INRA	A. Chabbi	abad.chabbi@lusignan.inra.fr
Grignon	Crop	3	48.84	1.95	125	INRA	B. Loubet	loubet@grignon.inra.fr
Mons	Crop	3	49.87	3.03	83	INRA	B. Mary	Bruno.Mary@laon.inra.fr
Avignon	Crop	3	43.92	4.88	32	INRA	S. Garrigues	sebastien.garrigues@avignon.inra.fr
Font Blanche	Forest	3	43.68	5.68	420	INRA	R. Huc	roland.huc@avignon.inra.fr
guyaflux	Forest	3	5.28	-52.91	32	INRA	D. Bonal	damien.bonal@nancy.inra.fr
Meteopole	friche	3	43.57	1.37	100	Meteo-France	J.-C. Calvet	jean-christophe.calvet@meteo.fr
Guyane	Grassland	3	5.35	-53.00	32	INRA	B. Burban	Benoit.Burban@ecofog.gf
							K. Klumpp	katja.klumpp@clermont.inra.fr
Osnes	Grassland	3	48.49	5.19	320	ANDRA /INRA	S. Conil	Sebastien.Conil@andra.fr
Champagne	Crop	3				CNRS	L.Joly	lilian.joly@univ-reims.fr

Sites localisation :

