

## Ecolab data sheet

The Ecolab is a modular structure coupling together three environmental chambers and one laboratory room (see Figure 1 below). Each environmental chamber (13 m<sup>3</sup> and 5 m<sup>2</sup>) can be independently controlled accurately for realistic climate and atmospheric conditions (temperature, humidity, CO<sub>2</sub>, O<sub>3</sub> and O<sub>2</sub> content, plasma and LED lighting). A mesocosm (1 m<sup>3</sup>) with temperature-control on three independent levels makes it possible to incubate ecosystems. This mesocosm can host both terrestrial and aquatic organisms and ecosystems (see Table 1 for more technical details). A prototype of the Ecolab (1 cell) is fully functional on site since 2010 and 4 Ecolabs of the second generation will be installed on site by early 2016, which makes up a total of 13 environmental chambers.

Figure 1. Photographs of existing facilities in the Ecotron IleDeFrance. Top, external view of the first Ecolab currently installed on a temporary platform – closed environmental chambers are isolated from the outside and can be fully controlled independently from each other. Left, internal view of one environmental chamber where a mesocosm with 4 soil lysimeter is installed. Right, a powerful light source in function above several plants. All photographs © CNRS UMS 3194.



Table 1. Major characteristics of Ecolab (Ecotron IleDeFrance)

<b>Ecolab Ecotron IleDeFrance</b>	
<b>General characteristics</b>	
Design	Three independent climate chambers around a laboratory room
Dimensions	Climate chamber: 13 m <sup>3</sup> , 5 m <sup>2</sup> and 2.2 m height Mesocosm: 1m <sup>3</sup> and 1,3 m <sup>2</sup>
Replicates	13 climate chambers (including a prototype chamber)
Confinement	Closed and controlled environment facility Stainless steel mesocosm for aquatic and terrestrial communities, including plants
<b>Climate control - continuous time control</b>	
Temperatures	-13°C to +47°C (± 0.2 °C) – continuous time control Independent temperature control of the mesocosm at 3 levels
Humidity	0.8 g water per kg air (-8°C) to 113 g.kg <sup>-1</sup> (50°C) equivalent to a range of 7-100%
Rainfall	Control of rainfall quantity, water temperature and quality, droplet size (three rainfall regimes)
Lighting	Modular LED-lighting (max.: 400 µmol.m <sup>-2</sup> .s <sup>-1</sup> at 80 cm), plasma lighting (max.: 500 µmol.m <sup>-2</sup> .s <sup>-1</sup> at 80 cm) and other classical technologies (LED bulbs, sodium lamps) on demand
Pressure	Uncontrolled (± 1000 Pa) or strictly controlled (under test)
<b>Atmospheric control - continuous time control</b>	
CO <sub>2</sub>	50-20,000 ppm ± 3 ppm (injection and absorption controlled by mass flow meters)
O <sub>3</sub>	0-4000 ppb range (under test)
O <sub>2</sub>	4000 -21,000 ppm ±100 ppm (downward control, substitution with nitrogen)
<b>Instrumentation</b>	
Mesocosm	Continuous measurement of weight
Atmosphere	Climate and gaseous measures (Pt100; Rotronic HF53/46 HC; LICOR LI820; CTX 300; Chromato Micro GC CP4900 for N <sub>2</sub> , O <sub>2</sub> , CO <sub>2</sub> , CH <sub>4</sub> ; Jumo 40; O <sub>3</sub> monitor)
Light	Pyranometer Apogee SP214 and spectrophotometers JAZ
Rainfall	Laser disdrometer
Soil	Soil humidity (Decagon MAS1), soil temperature (Pt100), soil water solutes (Prenart Super Quartz), soil gas (porous tubes and multiplexed gas analysers)
<b>Study systems</b>	
Plants	Up to small vascular plants up to 40-100 cm high above ground
Animals	Up to small animals including insects or fishes
Communities	Aquatic and terrestrial communities including soil-plant compartments, freshwater ecosystems or marine ecosystems