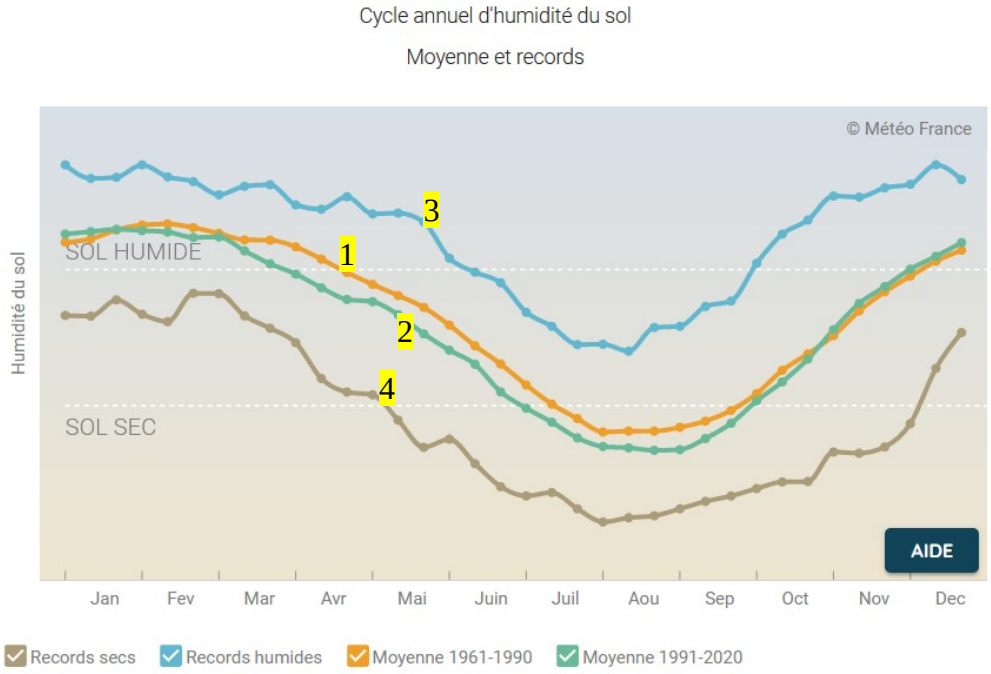
Evolution of the annual cycle of soil humidity
Past climate

1. Graph reading aid



4 data sequences are shown in the graph:

Sequence 1 'curve in orange':
Average of soil moisture per decade across France (or a region) during the period 1961-1990

Sequence 2 'curve in green':
Average of soil moisture per decade across France (or a region) during the period 1991-2020

Sequence 3 'curve in blue':
Soil moisture records concerning soil moisture per decade across France (or a region) during the period 1959-2022 (date of occurrence available in tooltip)

Sequence 4 'curve in brown':
Record dryness concerning soil moisture per decade across France (or a region) during the period 1959-2022 (date of occurrence available in tooltip)

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2. Definitions

Soil moisture: Soil moisture is expressed through the Soil Wetness Index or SWI representing for a plant the ratio between the water content available in the soil on any given day and its maximum value.

$$SWI = \frac{W - W_{wilt}}{W_{fc} - W_{wilt}}$$

where W is the integrated water content of the soil W_{wilt} the water content at wilting point and W_{fc} the water content of the soil at the field capacity.
The SWI varies mainly between the values 0 (extremely dry soil) and 1 (extremely moist soil). Below 0,4 soil is considered as dry and above 0,8 as moist.

3. Data and methods

The soil moisture values are issued from a digital simulation tool, called Safran Isba Modcou (SIM), widely tried and tested in the domain of research and of operational applications. It allows the calculation, with daily time-step, of the water content in the soil from a water balance model at an 8km resolution across France.
This tool is used in real time for the national hydrological follow-up and has been used to calculate soil water content since 1958 in the context of the project ClimSec (2008-2011).

4. References

Soubeyroux, J.-M., Kitova, N., Blanchard, M., Vidal, J.-P; Martin, E., Dandin, P. (2012), *Sécheresse des sols en France et changement climatique*, *La Météorologie*, 78, pp 21-30

Drias – Drought Indicators
http://www.drias-climat.fr/accompagnement/section/183

ClimSec website: http://www.cnrm-game-meteo.fr/spip.php?article605

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