



SOIL ORGANIC CARBON ANALYSIS

ROCK-EVAL® SOC

« The most accurate and reliable method for soil organic carbon analysis »

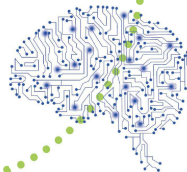


NEW WIDELY RECOGNIZED METHOD FOR STABLE AND ACTIVE CARBON FRACTIONING



ROCK-EVAL® SOC Laboratory analyzer

PartySOC Machine learning software



STABLE SOIL ORGANIC CARBON

- Carbon Farming
- Carbon sequestration credits
- CO₂ carbon credits
- Global warming mitigation

ACTIVE SOIL ORGANIC CARBON

- Soil Health part of "One health"
- Living soil
- Resistance of soils to drought
- Soil fertility
- Agricultural productivity

Rock-Eval® SOC also provides information on the **thermal reactivity** of organic and carbonate compounds in soils as well as **emission curves for CxHy, CO, CO₂ and SO₂** allowing an **advanced interpretation** of the nature of the sample.

Results can be implemented in "AMG" or "STICS" software to predict long term soil evolution!

For over 50 years, mechanization of agriculture and the increase of chemical inputs (fertilizers, pesticides, etc.) has allowed a drastic increase in yields but these practices have induced a **number a side effects on soils** : loss of biodiversity and of carbon, erosion, water pollution, reduced resistance to drought, compaction, etc.

Changes in the overall soil carbon stock can have a significant effect on climate regulation as well as on soil fertility and quality. Measurement of Soil Organic Carbon (SOC) is an essential tool to measure the overall health of a soil.



Carbon Storage

Soil contains 3 times as much carbon as global vegetation or the atmosphere.



Food Security

95% of our food is directly or indirectly produced on our soils.

Why is soil analysis so important ?



Better future

Nature based solution for sustainable development goals (agriculture, climate change mitigation, etc.)

BENEFITS

Fully automatic method : continuous unattended operation,

No chemical preparation required on samples,

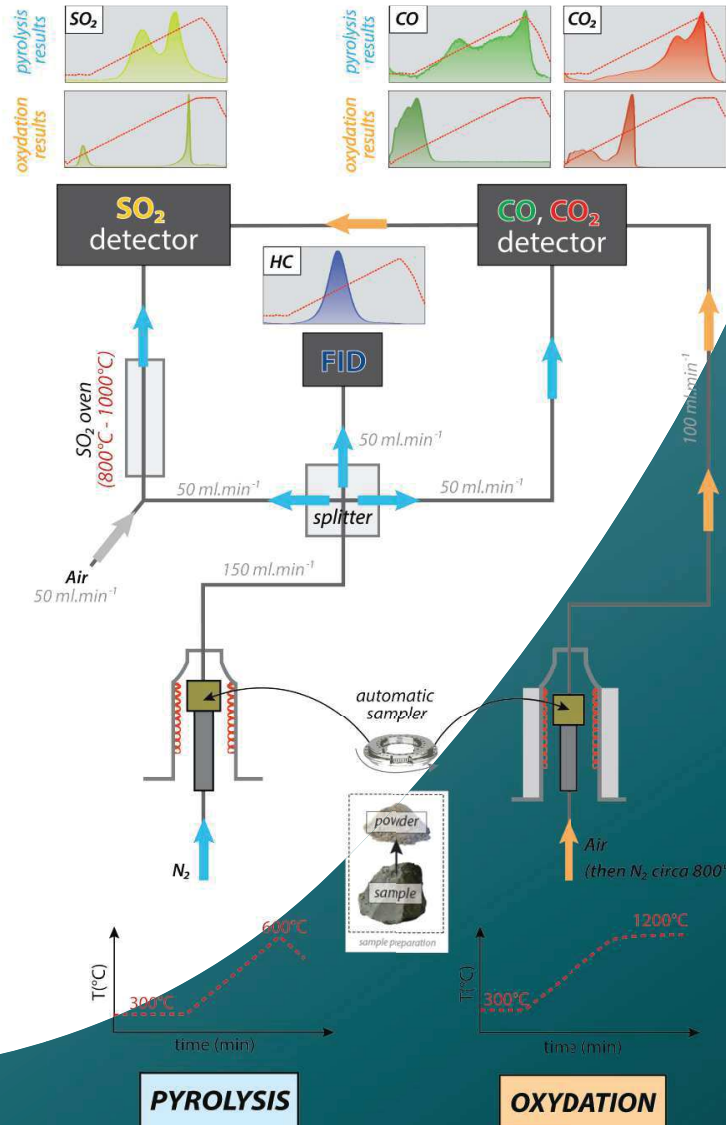
Low operation and analysis time,

Scientifically approved analytical methods giving access to TOC, TIC, Active Carbon and many more parameters,

Total sulfur and detailed sulfur species in option

PATENTED ROCK-EVAL® ANALYTICAL PROCESS

- Two separate temperature-controlled ovens : pyrolysis + oxidation for better accuracy
- FID Detector (CxHy)
- CO/CO₂ Infrared cell
- SO₂ ultraviolet cell

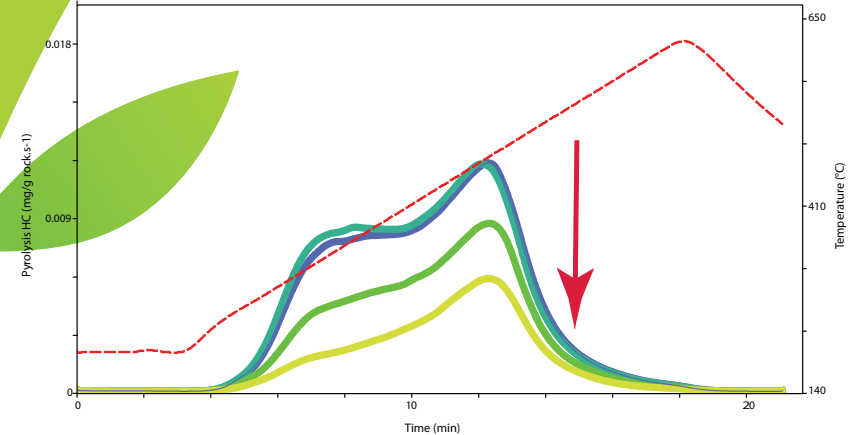


CASE STUDY

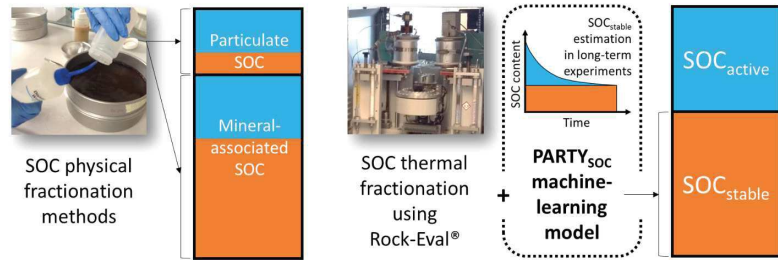
Field results of a soil sample from Terrasolis experimental farm sampled at different depths.

When increasing depth content of active carbon decreases & stable carbon increases

Red arrow shows active carbon decrease



ROCK-EVAL® & PARTYSOC PROCESS VERSUS PHYSICAL FRACTIONATION



■ SOC_{active} (centennially active SOC fraction) ■ SOC_{stable} (centennially stable SOC fraction)

Modified from Cecillon et al., 2021. / <https://doi.org/10.5194/gmd-14-3879-2021>

Rock-Eval® interpretation software includes a new calculation tool (PARTY_{soc}; Cecillon et al., 2021) allowing the calculation not only of the Soil Organic Carbon (SOC) but above all the segregation of its stable part (Stable Carbon fraction) and labile part (Active Carbon fraction) as well as R & I indexes (Sebag et al., 2016).

All existing soil organic carbon fractionation methods isolate fractions that are mixtures of centennially stable and active soil organic carbon.

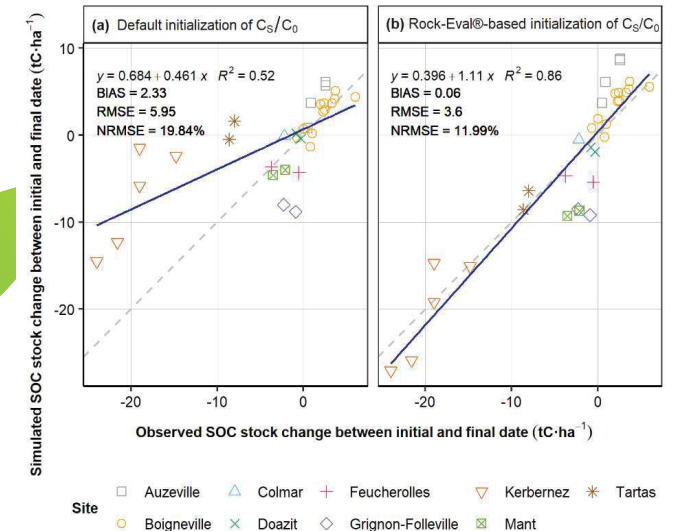
PARTY_{soc} is a machine-learning model trained on the Rock-Eval® thermal analysis of soil samples from long-term experiments in which the size of the centennially stable SOC fraction can be estimated

Better partitioning of active and stable carbon fractions allows better initialization of SOC dynamic simulations and models!

- ➔ When initialized with Rock Eval® results PARTY_{soc} calculations accurately partition SOC pools (stable and active carbon fractions) accounting for legacy effects of land management at independent sites.
- ➔ Better initialization of SOC dynamics simulation models at an annual time step (AMG, RothC, etc.)

KEY TO HAVING REALISTIC SIMULATIONS IN TEMPERATE PEDOCLIMATE CROPLANDS!

Performance of the PARTY_{soc} model to predict the centennially stable SOC proportion compared to the AMG default prediction. Points represent site-mean values based on initial topsoil samples from nine independent French long-term experiments. Statistics refer to the linear regression between x and y values (blue solid line). Kanari et al., 2021.





YouTube



LinkedIn

HEADQUARTERS :

27b rue du Port
92022 Nanterre (FRANCE)

CONTACT :

Phone: +33 (0)1 41 37 92 20

Fax: +33 (0)1 41 37 04 76

<https://www.vinci-technologies.com/contact/>

VISIT OUR WEB:

www.vinci-technologies.com/



ISO 9001:2015
BUREAU VERITAS
Certification