The MASCC project (2016-2019)

Mediterranean Agricultural Soil Conservation under global Change

*RACLOT Damien (IRD-UMR LISAH) and the MASCC Team**

http://mascc-project.org

♦ Which mitigation and adaptation strategies to global change in the Mediterranean area ?

MASCC aims to address this question by assessing current and future development of Mediterranean agricultural soil vulnerability to erosion in relation to projected land use, agricultural practices and climate change.

♦ Objectives:

i) to assess the **similarities/dissimilarities in dominant factors** affecting the current Mediterranean agricultural soil vulnerability by exploring a wide range of Mediterranean contexts;

ii) improve the ability to evaluate the **impact of extreme events** on both the current and projected agricultural soil vulnerability and the sediment delivery at catchment outlet;

iii) evaluate the **vulnerability and resilience of agricultural production** to a combination of potential changes in a wide range of Mediterranean contexts,

iv) and provide **guidelines on sustainable agricultural conservation strategies** adapted to each specific agro-ecosystem and taking into consideration both on- and off-site erosion effects and socio-economics issues.

♦ Scientific framework

WP1. Present soil degradation

T1.1. Similarities/dissimilarities in dominant factors

T1.2. Impact of extreme events on present agricultural soil vulnerability and the sediment delivery at the catchment outlet

WP2. Scenarios elaboration

T2.1. Assessment of innovative agricultural practices in terms of soil vulnerability and agricultural productivity

T2.2. "Narrative" scenarios (climate projection * agricultural mitigation strategies)

WP3. Numerical modelling using LANDSOIL

T3.1. Baseline simulations (calibration an validation)

T3.2. Simulation of both on-site and off-site soil erosion using the narrative scenarios of T2.2

WP4. Assessment of mitigation strategies

T4.1. On-site soil resilience

T4.2. Comparative analysis for water mobilization potentialities (off-site effects)

T4.3. Best mitigation strategies identification

♦ Consortium

Multi-disciplinarity researchers from **six (western) Mediterranean countries**:

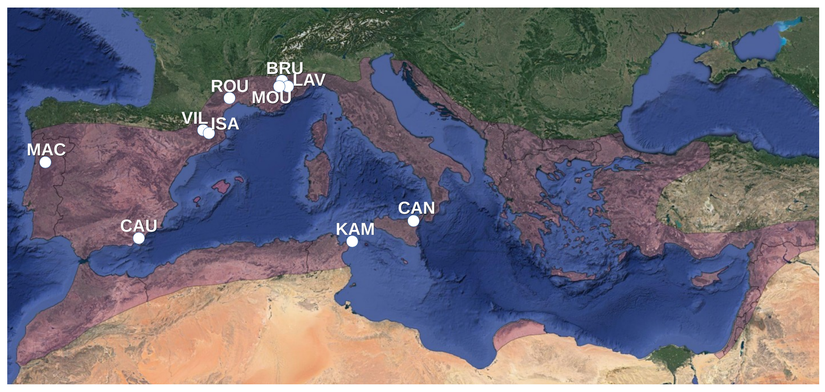
- France (UMR LISAH),
- Italy (Univ. Catania),
- Morocco (IAV Hassan II),
- Portugal (Univ. Aveiro),
- Spain (IDAEA-CSIC),
- Tunisia (INRGREF)

=> involved in **mid- to long-term environmental catchments monitoring**

=> with an **unrivalled database** on catchment soil erosion and innovative agricultural practices comprising a wide range of Mediterranean contexts elaborated during the R_Osmed network initiative (2011-2014, https://sites.google.com/site/rosmedsicmed/)

♦ Preliminary results derived from the R_Osmed database

Location of 10 small catchments monitored for water erosion in the R_Osmed network

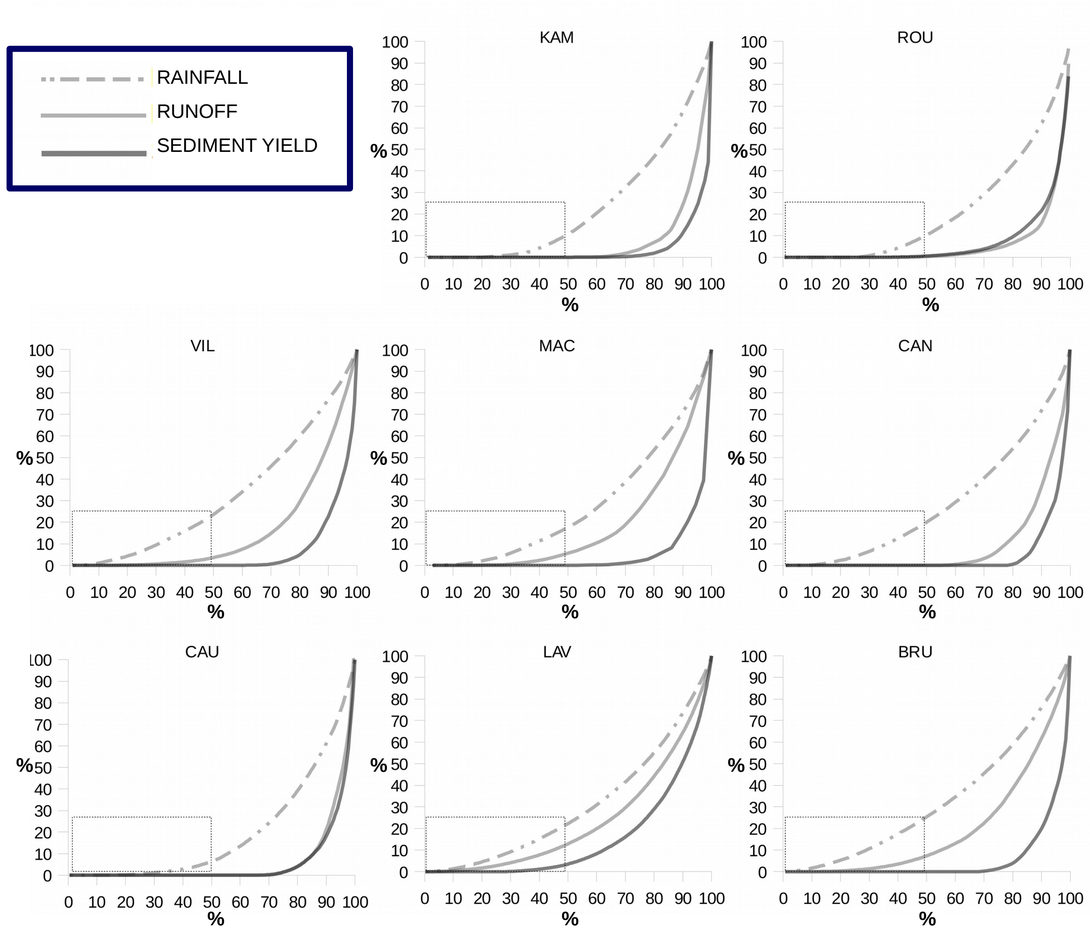


BRU = Brusquet catchment (1.08 km2, 25 years of measurements)
CAN = Cannata catchment (1.30 km², 10 years of measurements)
CAU = El Cautivo catchment (0.02 km², 20 years of measurements)
ISA = Ca l'Isard catchment (1.32 km2, 18 years of measurements)
KAM = Kamech sub-catchment (0.15 km2, 7 years of measurements)
LAV = Laval catchment (0.86 km², 28 years of measurements),
MAC = Macieira de Alcôba (0.94 km², 3 years of measurements)
MOU = Moulin catchment (0.08 km2, 24 years of measurements)
ROU = Roujan catchment (0.91 km 2, 15 years of measurements)
VIL = Can Vila catchment (0.56 km2, 16 years of measurements)

Finally, 166 years of hydrological and sediment data at small catchment outlet covering a large diversity of Mediterranean context in terms of climate (mean annual precipitation from 217 to 1303 mm.year^{-1}), soil types, land use and management, erosion intensities (mean annual sediment yield between 30 and 6000 t.km^{-2}year^{-1})...

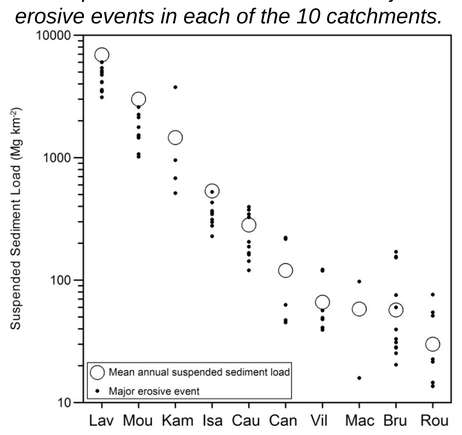
Considering the continuous database at monthly scale

Diversity of the rainfall, runoff and sediment yield time compression behaviour derived from a monthly database for 8 catchments of the R_Osmed network.

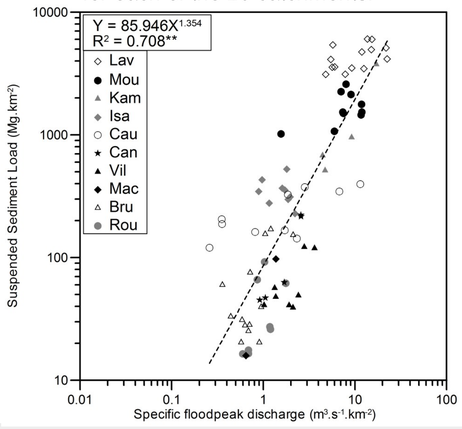


Considering the major erosive event

Mean annual suspended sediment load and suspended sediment load of the major erosive events in each of the 10 catchments.



Relationship (event scale) between specific floodpeak discharge and suspended sediment load for each of the 10 catchments.



♦ Concluding remarks

The preliminary results confirms

- a high contribution of a few events to total sediment yield in most of the tested Mediterranean catchments, i.e. a high sediment yield time compression
- that specific runoff discharge is a main driver of sediment yield -at least for the major events- when considering the Mediterranean area as a whole
- the nature and intensity of active erosion processes are as varied as the (natural and human) mosaic of Mediterranean landscapes

As a starting project, MASCC will foster the involvement of all additional participants that would like to contribute to the project and help us to capture this wide range of site-specific conditions that must be accounted for in mitigation and adaptation strategies to global change in the Mediterranean area.

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