



## **Soil organic carbon sequestration potential and gap of the sub-tropical region**

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A database of soil organic carbon (SOC) stocks was created for the sub-tropical belt using existing global SOC databases (WISE3; various SOTER) and new data from an ongoing project (ERC Africa-GHG) specific for the tropical forests of the African continent. The intent of this database is to evaluate the sequestration potential of a critical area of the world where most of the primary rainforests are located, and actually show undoubtedly high SOC losses associated with deforestation.

About 4100 profiles, quite well distributed over the entire sub-tropical belt, were used to calculate the actual SOC stock for the 0-30 cm and 30-100 cm depths of mineral soil.

First, this actual SOC stock has been related to the current Land Use Systems; successively, it has been interpolated taking into account Homogeneous Land Units (HLUs) in terms of soil type, climate zone and land use. Then, relying on consistent projections, of both climate and land use changes, for the years 2050 and 2100 under extremes IPCC-SRES emission scenarios such as the B1 and the A2, potential SOC stocks for these time frames has been calculated.

Soil carbon sequestration gap is calculated by the difference of the actual SOC stock and the future projections. When subtracting potential from the actual SOC stocks, negative values represent a gap in terms of possible SOC losses and so reduced carbon sequestration. The soil carbon gap indicates locations where there will be low soil-carbon levels associated with medium-to-high actual SOC stocks, and medium soil-carbon levels associated with high actual SOC stocks, depending on soil type, climate and land use conditions.

On the long term, 2076-2100, a SOC gap is observed under all scenarios in South America, just below the Amazonia basin, where are located open and fragmented forests. However, in the Amazonia basin deforestation decrease since no sensible SOC losses were observed. An important gap is observed also in the Congo basin and West Africa, but the gap is more fragmented in small spots than that observed in South America. Forests of Asia seems to be less interested from SOC losses and the projections show almost no gaps under both scenarios.

The soil organic carbon sequestration potential database is intended to provide an indication at the regional level of the potential for policy makers to provide environmental services and drive specific policy to increase sustainable land management.