CONCERTO

CONCERTO Graphical Summary

Plant phenology evaluation of CRESCENDO land surface models using satellite-derived Leaf Area Index

Part 2

Seasonal trough, peak, and amplitude

Funded by the European Union

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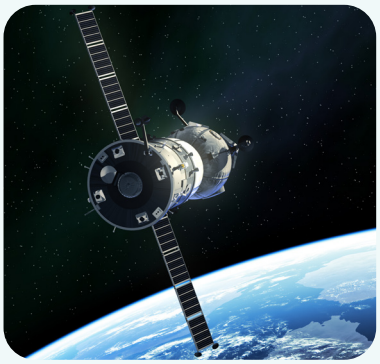
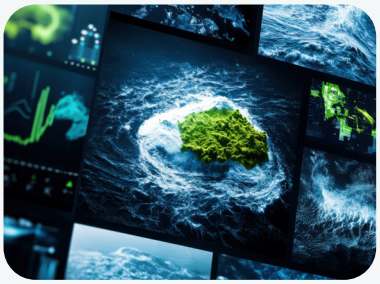
Background



Land Surface Models are the principal tools for scientists to study past, present, and future climate changes impact on vegetation, soil, and land surface. However, those tools need to be evaluated against observations to identify their limitations and areas where they could be refined. In this study, the ability to represent the maximum and minimum amount and timing of plants' leaf production is investigated by comparing models' results against satellite products. The evaluation of models' ability to capture the leaf production is fundamental because it can influence the ability of models to correctly reproduce CO2 exchanges between land and atmosphere and, consequently, the estimates of the ongoing and future climate changes.

Objective



The evaluation of scientist's tools is vital to correctly understanding the existing uncertainties in reproducing the ongoing changes and estimating the impacts of future climate mitigation and adaptation strategies.

Results

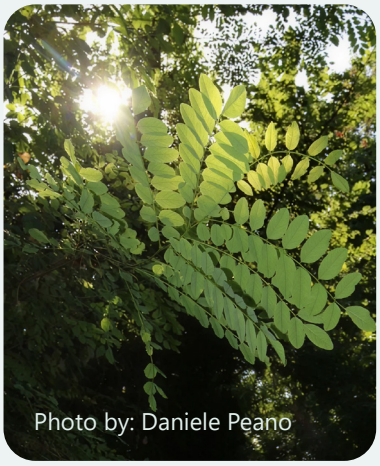


Photo by: Daniele Peano

The set of evaluated land surface models displays a general delay in reproducing the observed timings of maximum and minimum leaf production. This is not the case in the regions dominated by crops and shrubs. In general, the actual land surface models require further development and refinement to reduce their discordance with observations and increase their reliability for providing quality assessment of planned future mitigation and adaptation strategies.

Stakeholders

Academics

Citizen scientists

EU institutions

Key messages

The evaluation of the scientists' tool goes through comparison with observations coming from satellite products and local data, and it is vital to understand the models' strengths and weaknesses.

State-of-the-art land surface models still require refinement and development to improve their estimates of leaf production.

Practical value

Despite limitations, the actual land surface models produce valuable results to establish pathways for future mitigation and adaptation strategies.

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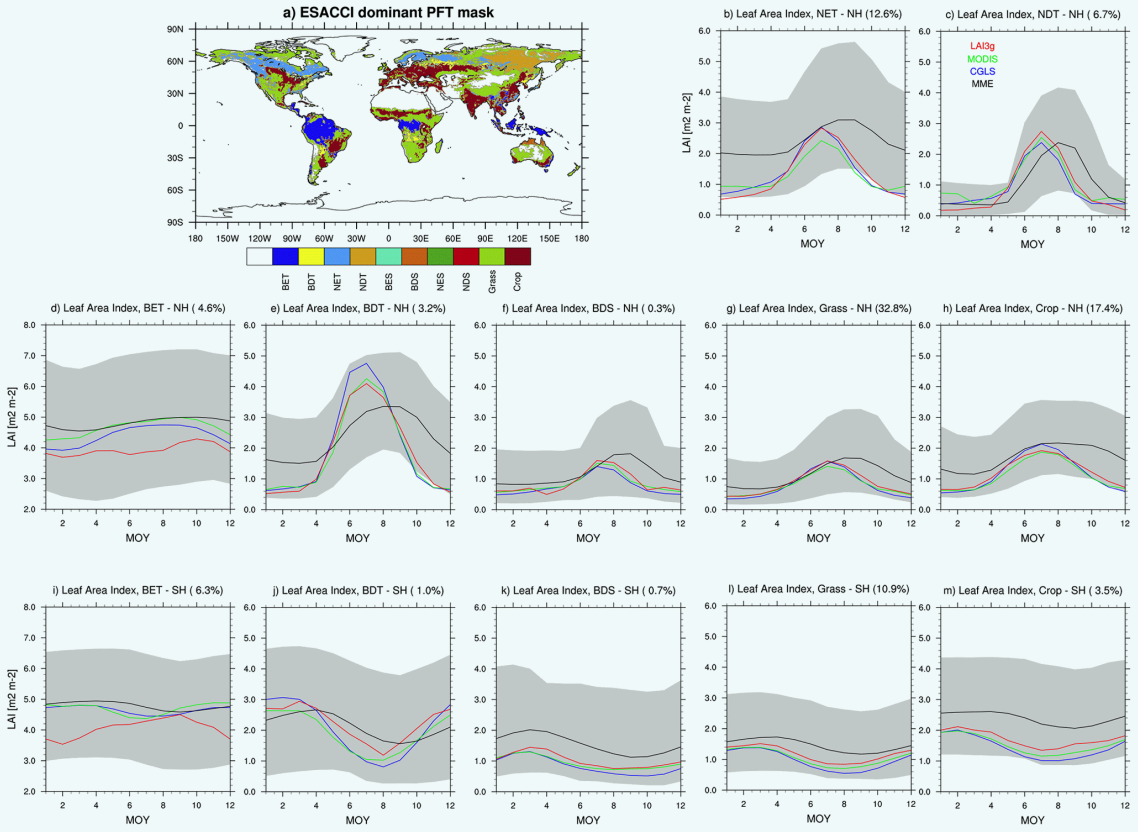
Figure



(a) Global distribution of the main land cover and the comparison in leaf amount (i.e. Leaf Area Index) between satellite products (red, green, and blue lines) and land surface models (black plus grey shaded areas) in (b) needle-leaf evergreen tree (NET) in the Northern Hemisphere (NH); (c) needle-leaf deciduous tree (NDT) in the NH; broadleaf evergreen tree (BET) in the (d) NH and (i) SH; broadleaf deciduous tree (BDT) in the (e) NH and (j) SH; broadleaf deciduous shrub (BDS) in the f) NH and (k) SH; grass-covered areas (Grass) in the (g) NH and (l) SH; and crop-covered areas (Crop) in the (h) NH and SH (m).

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