EnMAP – a scientific seed instrument for information-driven sustainable agriculture

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THEME: Airborne and innovative remote sensing platforms and techniques. SESSION: The EnMAP Imaging Spectroscopy Mission and its science perspectives.

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ABSTRACT:

Food demand is expected to double until 2050. Sustainable efficiency gains are essential to meet future food demand. Site specific monitoring of crop development aims at increasing agricultural efficiency by optimizing energy, fertilizer and plant protection investments, while at the same time sustainably increasing yields. Accurate yield forecasts allow for more efficient planning of food processing infrastructures as well as for more stable food prices through commodity futures. Global agriculture, in its role to balance future food demands, will develop into the central environment-related information-driven economic sector of the future. Management as well as forecast continuously combine knowledge contained in models with information obtained from sensors. Remote sensing from space is the most feasible way to acquire the radiative properties of crops site specifically and in a spatially distributed way. It takes the most advanced EO sensors and EO science to understand and convert radiative properties into crop parameters, which in a universal manner describe crop structure, biochemistry and phenology. It furthermore takes the most advanced information- and management-science to integrate these data streams into applied agricultural management systems.

The paper describes the information flow in the agricultural management chain. It combines crop monitoring observations with models of crop growth and crop management, which simulate the complete process of plant growth including the impact of environmental factors like weather and soils as well as management options like seeding, fertilizing, fighting diseases etc. It describes the potential future role of Earth Observation as the backbone of an applied global farm information system. The hyperspectral EnMAP mission will play the unique role as a seed, which enables EO science to develop universal (at each point of the Globe), stable (under all conditions) and fundamental (based on physical principles) understanding of the spatial diversity of crop development from radiative transfer observations.

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