



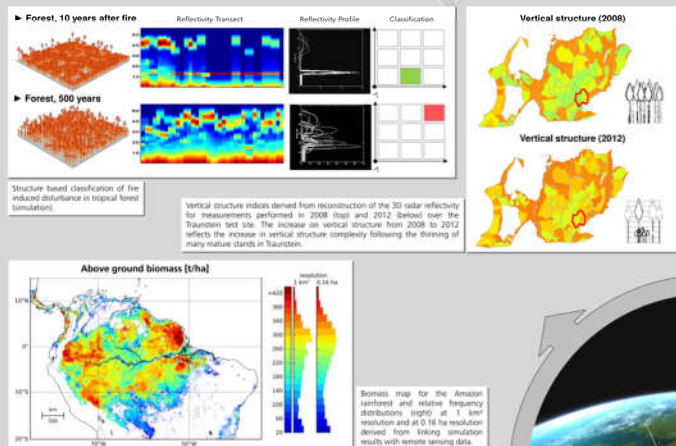
Tandem-L: Highly Innovative Radar Satellite Mission for Climate Research and Environmental Monitoring

Motivation

Tandem-L is a proposal for a highly innovative satellite mission for the global observation of dynamic processes on the Earth's surface with hitherto unknown quality and resolution. Thanks to the novel imaging techniques and the vast recording capacity, Tandem-L will provide urgently needed information for solving pressing scientific questions in the areas of the biosphere, geosphere, cryosphere and hydrosphere. Tandem-L will make a vital contribution towards a better understanding of the Earth system and its dynamics.

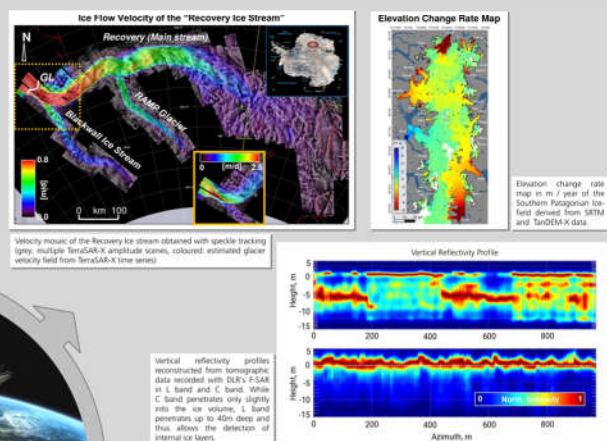
Key Questions of the Biosphere

1. What is the amount of biomass stored in the forests of the Earth, and how is it spatially distributed?
2. How does the biomass and structure of forests change in time? Where are the hotspots of anthropogenic deforestation?
3. How do climate change and anthropogenic disturbances affect the structure and stability of forests? What are the influence factors and how quickly do they spread?



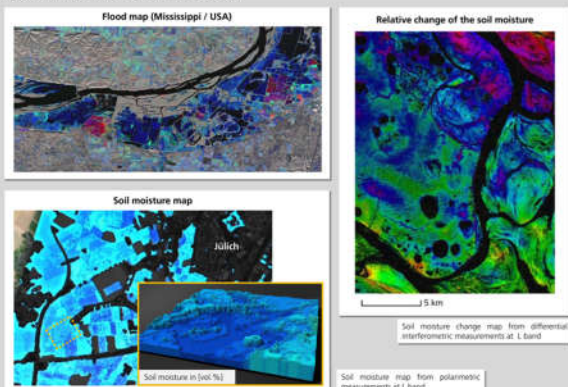
Key Questions of the Cryosphere

1. How is climate change impacting glaciers and ice caps? Which mechanisms cause this change, and how can they be better assessed?
2. Which processes are driving the current mass depletion in the major ice sheets? How can the uncertainties in determining mass changes be reduced?
3. How is global climate change altering the sea ice drift and the deformation patterns in the Arctic and Antarctic? What methods can we use to improve modelling of internal forces and to obtain better sea ice forecasts?



Key Questions of the Hydrosphere

1. How do the spatial and temporal dynamics of soil moisture contribute to soil and plant transpiration?
2. How does this affect the exchange of water and energy between the soil and the atmosphere?
3. How do soil moisture patterns influence the formation of new ground water, surface run-off and soil water storage in moderately large river basins?
4. How strong is the link between spatiotemporal changes in soil moisture and changes in regional climate (and weather)?



Key Questions of the Geosphere

1. Is it possible to improve the forecast model for a particular earthquake?
2. Where is the fracture zone of an earthquake located, and what is its size?
3. Is it possible to use measurements of surface deformation to predict danger in volcanic regions?
4. Which influences have processes of the hydrosphere and cryosphere or human interventions on geohazards like landslides and other ground subsidence?

