"From the hydrological catchments to the atmospheric basins: A conceptual rupture?" tries to elaborate different approaches to understand how the research from the "land surface / atmosphere interactions" concept is integrated and scaled towards the results obtained by Earth Observation Systems (EOS). This introduces a discussion about why Earth observation from space seeks the highest resolution, no matter it may or it may not match the scale of "case studies" in the landscape structure. Research in the LAO-Lab provides examples to contribute to the discussion about the concepts underlying the research with EOS and about how to integrate it in distinct hydrological or atmospheric dynamics (i.e., questions about euclidean / lagrangian visions, about transect-based measures for geolocating point-sources / point-based measures for locating diffuse-source areas, about seasonal and daily variability studied in extensive ecosystems and agro-systems / temporal variability and spatial complexity studied in cities and mountain sites, among other issues).