

How much biology does GCOS need?

RJ Scholes, Global Change and Sustainability Research Institute, University of the Witwatersrand

Earth System Science teaches us that the living parts of the biosphere have a profound impact on its dynamics at various space and time scales. The GCOS list of fifty Essential Climate Variables (ECV) contains ten which are predominantly biological, a term which includes ecological. These include seven over land (the land cover, its leaf area, absorption of photosynthetic radiation, reflectance of radiation, aboveground biomass, soil carbon and fire occurrence), one in the cryosphere (permafrost) and two in the ocean (colour and phytoplankton). The presentation briefly surveys the status of observation efforts for these variables. It then discusses the key biological processes which interact substantively with the climate system and various space and time scales, including those which could be involved in abrupt future change in the 21st century. It concludes by suggesting how those not presently part of the ECV set could best be incorporated in our approaches to understanding and predicting the state of the planet.