Low-dimensional modeling of the dynamics of rainfed wheat in semi-arid region of Settat (Morocco), from NDVI satellite data

Sylvain Mangiarotti (1), Laurent Drapeau (2), Raphaël Coudret (2), Lionel Jarlan (2,3)

(1) Centre d'Etudes Spatiales de la Biosphère, UPS-CNRS-IRD-CNES, France (sylvain.mangiarotti@ird.fr), (2) Centre d'Etudes Spatiales de la Biosphère, UPS-CNRS-IRD-CNES, France, (3) Université Cadi Ayyad, Morocco

Wheat production mostly results from rainfed agriculture in Morocco. As a consequence, yields largely rely on the climatic conditions and its associated variability. The dynamics of the vegetation in semi-arid regions is characterized by a low predictability. Nonetheless, previous nonlinear analyses have also revealed dynamics of low dimension, promoting the investigations towards chaotic behavior and opening the way to a low-dimension modeling. Vegetation index from AVHRR sensor allows for a long term (almost 30 years) documentation of such dynamics. This information is used as a proxy of the dynamics of wheat and is analyzed over the province of Settat (Morocco) through a global modeling approach. Low-dimensional models obtained from this approach are introduced and discussed.