Geophysical Research Abstracts, Vol. 8, 04897, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04897

Influence of climate variability on wheat production in Portugal

Célia Gouveia (1) , Ricardo M. Trigo (2) and Carlos C. DaCamara (2)

(1) Escola Superior de Tecnologia, Instituto Politécnico de Setúbal, Campus do IPS, Estefanilha, Setúbal, Portugal (Phone: +351 265790000, e-mail: cgouveia@est.ips.pt); (2) Centro de Geofísica da Universidade de Lisboa, Ed. C8, Campo Grande, 1749-016 Lisboa, Portugal

It is widely known that wheat production and quality are associated with several factors, e.g., seed variety, soil type and fertilization techniques. However, climate is one of the major factors that influence the spatio-temporal distribution of most agricultural systems, which are vulnerable to interannual climate variability and, in particular, to extreme events and changes in traditional patterns of regional climate. During the last two decades, the study of weather conditions and their connection to the plant growth and crop yield has been very important in agricultural research. At the same time, new sensors have been introduced on board of recent satellites allowing the development of remote sensing products with direct applications in agriculture, namely crop identification, crop growth monitoring and yield prediction. The majority of wheat in Portugal is sown in October and November and harvested between June and July on the following year. This sequence leads to relatively small productions, due to the short vegetative cycle, with only five /six months. The average climatic conditions of southern Portugal, where 95% of wheat grows, are classified as being Mediterranean climate, with mild and wet winter and dry and hot summer. In these conditions, the wheat culture do not thrive very well, namely in its Atlantic version, due to the concentration of available precipitation during the winter season. The present paper has three main objectives; First, to describe the evolution of wheat production and yield in Portugal and to relate it with the most important cultivated area in southern Portugal, Alentejo. Secondly, to locate this area, using remote sensing data, and to relate this spectral data with wheat yield. For this purpose, we use the normalised difference vegetation index (NDVI), retrieved between 1982 and 2002 from the AVHRR instru-

ment. The year-to-year variations in European vegetation greenness were estimated and related to national wheat yield. A significant correlation was found over Alentejo region and a validation using Corine2000 land cover map has confirm the correspondence with arable land code pixels. Finally, we evaluate the relevance of the NAO atmospheric circulation pattern in terms of wheat yield. A significant influence of the NAO, associated to spatial patterns of variation of different climatic fields, namely precipitation and radiation, on wheat seed and yield in Alentejo region was found. The most significant monthly correlations were obtained for the two important stages in vegetative cycle: February (NAO/Seed, Precipitation/Seed and Radiation/Seed) and June (NAO/Yield and Precipitation/Yield).