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Primary production along the Northwest African coast : from satellite data to an idealized study of the coastal upwelling ecosystem

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The northwest African coast (between 10 and 33°N) is well known for the coastal upwelling which results in a high biological productivity. The surface chlorophyll (SCHL) variability is investigated using SeaWiFS data over seasonal and intra seasonal time scale over the period 2000-2004, characterized by weak inter annual anomalies. A strong contrast of surface chlorophyll seasonal cycle is observed between the North and the South of the study area. According to this criterion, three regime are defined. The northern regime between 24°N and 33°N is characterized by relatively high SCHL and persistent upwelling conditions with a maximum between May and September. The southern regime between 10°N and 19°N shows a strong SCHL seasonal cycle with very high SCHL in Spring and a relaxation season from June to September. The transitional regime is characterized by very high SCHL throughout the year and a weak seasonality. The observed SCHL variability is well explained by the wind stress forcing variations. In addition the width of high surface chlorophyll-a coastal band shows significant meridional variations with an increase progressing south. The processes which govern the width of the productive zone and its seasonal variations are investigated. To complete this study an idealized model is set up to identify and quantify the impact of those processes.