Climate variability analysis for temperature and precipitation based on REMO datasets

Y. Chen, G. Churkina and M. Heimann

Max-Planck-Institute for Biogeochemistry, Jena, Germany (ychen@bgc-jena.mpg.de)

Environment change is currently one of the great challenges that humans are facing. Most of the environment changes are closely related to climate change. It is either the result of climate change or the factor causing climate change, or both. Climate data are used in ecosystem modeling as the forcing for environment change research. The REMO data were used as one of the forcing for ecosystem modeling within the CarboEurope-IP project. We managed to derive the climate signals represented by REMO data, in order to explore how the climate change is happening, and what influence could be made on environment. The climate change can be characterized by appearance of the trend in climate variables and changes in their variability. Our work here is focusing on the climate variability. Through the statistical analysis such as EOF, rotated EOF, CCA and wavelet analysis as well, we have found some interesting points. In year 2003 the temperature in Europe mostly has the negative anomaly in the months from Jan to Apr and Oct; but positive anomaly in the other months. The positive anomalies are much stronger in summer time (especially in June and August) in the middle and Western Europe. The CCA analysis between temperature and precipitation shows that the temperature anomaly is mostly opposite to precipitation anomaly. Therefore, in 2003 the extreme heat in summer corresponds to less precipitation, which leads to relatively serious drought in that year. None of EOF or REOF patterns are similar to the anomaly pattern of 2003 for temperature. It could be concluded that the extreme climate in 2003 is not a typical case, but an exceptional climatic event. The further cluster analysis based on REOF space will be carried out soon for making sub-region, with which the more detailed analysis can be made, focusing on a specific coherent region.