Climatic and energetic modelling of regional utilization of wind energy for Hungary

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Due to the ever increasing anthropogenic environmental pollution and the worldwide energy claim, research and exploitation of environmentally sound renewable energy sources becomes more and more important. Developed countries, especially the European Union, support and inspire systems based on renewable energies, in this way exploitation of wind energy. Besides economic incentives, the most extensive and most accurate scientific results are required in order to insure regional planning with the aim of selecting geographical coordinates for optimal exploitation of renewable energy sources. In this project a climate oriented model (CMPAM) has been developed, which facilitates the choice of those regions, where exploitation of the available wind energy would yield profit. The model consists of several sub-moduls, the most important one of them is the wind field modelling (CMPAM/W). Our research focuses on this sub-modul. This wind field modelling comprises methods and calculations of atmospheric physics and geostatistics and its aim is to supply information on wind field for system planning and economic efficiency calculations, which can not or can hardly be supplied by using other methods. Resolution of the CMPAM/W grid system is 4 km^2 and provides the following information for each grid: expected value of the wind speed, probability of the expected value, uncertainty of the wind speed and width of the probability interval. The CMPAM was run for a database of Hungary for different altitudes. Further processing of CMPAM and the other sub-moduls is based on GIS. The other sub-moduls (those of physical geography, economic geography, civil service and landscape ecology) are present in a general form. Speciality of the model is that the sub-moduls can be interpreted and adaptable even by themselves, so they are capable of solving other tasks, as well.