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PREDICTIVE MODELLING OF ARCHAEOLOGICAL SITE LOCATION: PROSPECTS AND CHALLENGES
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Archaeological predictive modelling has been used for over twenty years as a decision-making tool in cultural resources management. It is a technique to predict the location of archaeological materials in the landscape, by finding or hypothesizing correlations between existing archaeological data and various features of the natural landscape, like slope, soil type, geology or distance to water. These correlations can then be extrapolated to areas where no archaeological information is available.

Predictive models can be useful as tools for cultural resources management. They indicate the zones where archaeological remains are most likely to be found, and this can serve to guide planning decisions and to decide on archaeological research intensity during development plans. But they can also be used for establishing the validity of archaeological theories concerning the behaviour of prehistoric people. The models can be tested by fieldwork, and the test results will then tell us something about their predictive power, and if the assumptions used for setting up the models were correct.

Various procedures can be used to produce predictive models, ranging from multi-criteria analysis and standard statistical procedures like logistic regression to more advanced methods such as Bayesian statistics. However, the main factors determining the success of predictive modelling are the availability of reliable archaeological data, the reconstruction of the palaeo-environment, and the theoretical concepts used by archaeologists.

In this paper, I will present an overview of the state of the art in predictive modelling, and present case studies from Europe that illustrate the potential and problems of the methods used. I will argue that a good theoretical basis should be the starting point for creating a modelling structure that will allow for developing and adapting models to different regional cultural and environmental characteristics. Palaeo-environmental information is crucial to this: if we want to understand settlement location choices of prehistoric people, we need to know what the natural environment was like in the period under consideration, and what possibilities and constraints it offered to the people concerned.

Furthermore, it is crucial that predictive models are not seen as a single answer to the question of where people settled in the past; in most cases, the available archaeological data and archaeological theories are simply too uncertain for that. A good predictive model should produce the best possible prediction with the available information. Uncertainties should be made explicit, and it is only through field testing that we will be able to improve the models, and to understand better what theories of settlement location choice are the most plausible for a particular archaeological setting. The dialogue between model, data and interpretation is therefore an important aspect of the modelling exercise.

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