Integrating climate and GIS as key factors in the modelling of cultivar suitability to a specific environment

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The availability of high resolution climate data is of relevance in viticultural studies within a wide range of topics. In the context of cultivar adaptation to a changing environment, new economic challenges in winegrape production as well as the expansion of viticultural areas in South Africa, the need for agroclimatological studies that are integrated with geographic information systems (GIS) is increasing. A need for meso/micro scale studies, in combination with macroclimate studies, exists. Currently, mesoclimate is monitored in the Western Cape wine regions by means of 84 weather stations. It would be too costly to extend the network sufficiently to improve models at vineyard scale, but an alternative is to incorporate thermal remote sensing data for interpolation and modeling purposes. It is proposed to collect MODIS-Land Surface Temperature (LST) data into a local database and to apply temperature modelling to locations with existing weather stations, followed by validation in areas which is not in close vicinity to the weather station network. Apart from interpolation of data for climate modelling, the project aims to work at a vineyard scale, focusing on the growth and ripening of cultivars in existing vineyards in order to assess the interaction between meteorological features, derived from the spatial interpolation of temperature data or MODIS-LST products, and plant growth reaction. Collaboration between experts in GIS, remote sensing and database management/online implementation is necessary to provide a two-way interface between the viticultural manager and the researcher, which can be used to collect and manage data at a vineyard scale. The interpolation of temperature data can be done semi-real time from satellite data into an open-source GIS application, which can also be managed and served online in other open-source applications. Creating a web-based interface, showing basic block information and interpolated climate data, and facilitating data input which is relevant to the producer, but also relevant to improve models used in the research database, is a priority in this project. Some practical aspects and key issues to achieve this goal will be discussed.

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