



Gap filling in weather data time series - air temperature

Milos Lompar (1), Ljiljana Dekic (1), and Branislava Lalic (2)

(1) Republic Hydrometeorological Service of Serbia, Belgrade, Serbia, (2) University of Novi Sad, Faculty of Agriculture, University of Novi Sad, Department for Field and Vegetable Crops, Novi Sad, Serbia

Data gaps are common problem of operational automated weather station (AWS) networks. If network is established in order to provide measured weather data on daily basis (for agricultural purposes for example) problem of data gaps become even more pronounced as well as a need for gap filling procedure.

In this study was tested procedure for air temperature gap filling based on European Centre for Medium-Range Weather Forecasts's (ECMWF) ERA5 reanalysis data and measured data obtained from AWS network of Forecasting and Warning Service of Vojvodina in plant protection (PIS) (Serbia). ERA5 provides hourly estimates of a large number of atmospheric, land and oceanic climate variables with spatial resolution of 30 km. PIS AWS network, established and maintained from 2011, consists of 58 AWS's installed in crop canopies, vineyards and orchards in Vojvodina (northern Serbia) region in order to provide data related to atmospheric conditions relevant for harmful organism appearance and development. Typical set of data measured within PIS network includes hourly and daily values of: air temperature and relative humidity, soil temperature, soil water potential, leaf wetness duration and precipitation.

Two procedures for gap filling are tested: 1) missing data are replaced with ERA5 data from nearest grid point and 2) debias procedure, based on data measured on AWS of interest, was applied on ERA5 data from nearest grid point. Both procedures are run for different duration of data gaps and different locations over the period of interest (1.3.-31.8.). Results are compared by comparison of RMSE obtained using ERA5-only and ERA5-debiased air temperature data series.