



Prediction of soil attributes through interpolators in a deglaciated environment with complex landforms

Adriano Luis Schünemann (1), Elpídio Inácio Fernandes Filho (2), Marcio Rocha Francelino (2), Gérson Rodrigues Santos (2), Andre Thomazini (2), Antônio Batista Pereira (1), and Carlos Ernesto Gonçalves Reynaud Schaefer (2)

(1) Universidade Federal do Pampa, São Gabriel-RS (als@unipampa.edu.br), (2) Departamento de Solos, Universidade Federal de Viçosa, Viçosa-MG, Brazil (marcio.francelino@ufv.br)

The knowledge of environmental variables values, in non-sampled sites from a minimum data set can be accessed through interpolation technique. Kriging and the classifier Random Forest algorithm are examples of predictors with this aim. The objective of this work was to compare methods of soil attributes spatialization in a recent deglaciated environment with complex landforms. Prediction of the selected soil attributes (potassium, calcium and magnesium) from ice-free areas were tested by using morphometric covariables, and geostatistical models without these covariables. For this, 106 soil samples were collected at 0-10 cm depth in Keller Peninsula, King George Island, Maritime Antarctica. Soil chemical analysis was performed by the gravimetric method, determining values of potassium, calcium and magnesium for each sampled point. Digital terrain models (DTMs) were obtained by using Terrestrial Laser Scanner. DTMs were generated from a cloud of points with spatial resolutions of 1, 5, 10, 20 and 30 m. Hence, 40 morphometric covariates were generated. Simple Kriging was performed using the R package software. The same data set coupled with morphometric covariates, was used to predict values of the studied attributes in non-sampled sites through Random Forest interpolator. Little differences were observed on the DTMs generated by Simple kriging and Random Forest interpolators. Also, DTMs with better spatial resolution did not improved the quality of soil attributes prediction. Results revealed that Simple Kriging can be used as interpolator when morphometric covariates are not available, with little impact regarding quality. It is necessary to go further in soil chemical attributes prediction techniques, especially in periglacial areas with complex landforms.