Foreword

In Australia, a wealth of soil data has been collected over the past century. The Australian state and territory governments are responsible for much of the nation's soil information, although other collections of soil data are held by CSIRO, Geoscience Australia, universities and private companies. While a national collation of soil mapping exists (the Australian Soil Resource Information System, ASRIS), a lack of national coordination and disparity in these collections has confounded efforts to develop more consistent and comprehensive information on soil in a usable format.

The need is for soil information that covers all of the Australian biomes with a set of soil attributes that represent the local condition of soil at a fine spatial resolution. Such information will be crucial as we move to better understand the vital role of soil in ecosystems and to address national challenges in agriculture, the environment and the economy.

In 2011, the Terrestrial Ecosystem Research Network and CSIRO funded a project to address the above needs. The project (coordinated by CSIRO and working with a broad cross-section of the Australian soil science community) produced the Soil and Landscape Grid of Australia (SLGA), the first continental expression of fine-resolution soil attribute information that adheres to, but also enhances, the specifications of the *GlobalSoilMap* initiative, which made a case for the soil information needs of the world.

The SLGA provides three-dimensional fine spatial resolution soil attribute maps derived from a collation of national site data from all the Australian states and territories and other collections, new spectroscopic measurements of soil attributes, traditional soil mapping, climatic data, recently derived terrain attributes and data derived from geophysical remote sensing. The maps were derived using new methods for spatial modelling and estimation of uncertainties. In this Special Issue of **Soil Research**, we present articles that provide background to the SLGA project and on the methodologies used in the various aspects of the project and their results.

Research articles published in the Special Issue are:

1. Grundy *et al.* provide an overview of the SLGA project.
2. Viscarra Rossel *et al.* describe the methodology used for the Australia-wide three dimensional spatial modelling and derivation of uncertainties, using site and spectroscopic data and provide results on the mapping of soil attributes.
3. The articles by Holmes *et al.* and Odgers *et al.* describe the implementation of algorithms for disaggregating traditional soil maps to derive estimates of soil attributes for Western Australia and South Australia.
4. Gallant and Austin describe the derivation of terrain attributes at a fine spatial resolution from the Shuttle Radar Topography Mission (SRTM) digital elevation model (DEM).
5. Clifford and Guo describe a statistical approach for combining soil maps derived using different methods.
6. Articles by Le Guillou *et al.* and Hicks *et al.* describe the development of a mid-IR spectroscopic database using the soil and data held in the ASRIS and the National Soil Archive.
7. Kidd *et al.* describe the spatial modelling for Tasmania using locally derived covariates
8. Liddicoat *et al.* describe the mapping of soil carbon stocks in South Australia in the 0–30 cm layer.

The end result of the project is some 11 attributes predicted nationally in six layers to a depth of 2 m, with estimates of uncertainty, new landscape descriptors, a mid-infrared spectroscopic database and an online access system to access the data (www.csiro.au/soil-and-landscape-grid). The new products are available free of charge.

A community of about 40 people has contributed to the development of the SLGA. Contributions range from help with the collection of data, provision of diverse experiences and reviewing of the outputs. We are indebted to this community for that help and support. The National Committee on Soil and Terrain provided considered comment and advice on the project and ensured that the new system will be used in the many applications that it was designed to meet.

The SLGA, described in these research papers is the initial version. The intent is for continual improvement using a consistent versioning process. These papers provide the basis for that.

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