



EM mapping for precision management

Manaaki Whenua
Landcare Research

Authors: Pierre Roudier and Carolyn Hedley (both Landcare Research,
Palmerston North)

Abstract:

EM mapping is a spatially enabled technology that assesses soil variability based on electrical conductivity. Associated with a high-precision positioning system (namely RTK D-GPS), EM mapping provides a fast and cost-effective way to map soil variability of the paddock or the farm, at a very good spatial scale.

This presentation will explain the underlying principle of the EM measure, and the process from the collection of data to a useable map.

This will be illustrated using case studies from a SFF project using EM maps for precision irrigation management. The soil variability of a 90-hectare field located near Bulls (Manawatu) has been quantified at high resolution (5 m). The resulting EM map supported different applications, ranging from precision carbon accounting to real-time precision irrigation.

In the first example, EM surveying was used to target soil-sampling positions ($n = 100$), and to derive soil organic carbon layers.

In the irrigation example, the EM survey has been used to quantify soil variability with respect to soil water storage in an irrigated maize field: 9 communicating soil water sensors were positioned to monitor the full range of soil EC values. Subsequently, EM data were also used alongside meteorological data to derive real-time soil water status maps.