Soil mapping exercise and field work in New Island

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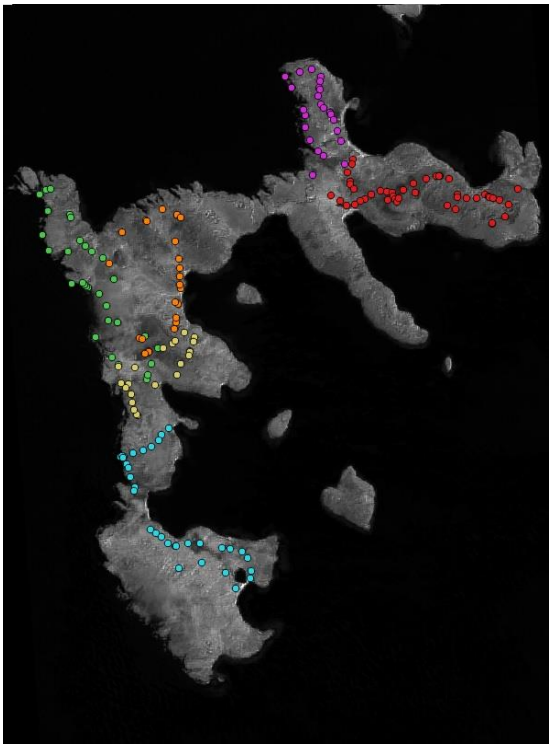
New Island is one of the western islands of the Falkland Islands archipelago. Its western coastline is characterised by sheer cliffs (mainly sandstone) which are the nesting (breeding) ground of Black-browed albatrosses, King Cormorants and Rockhopper penguins. The cliffs are a distinctive character of the island and the most scenic and spectacular landscape that people can enjoy along with several white sandy beaches scattered all over. A field research station built in the 1970s has been offering a great support to researchers coming to study what nature shows at its best in this place. The mix between the natural beauty, the self-contained and small environment, and the research facilities provided by New Island, made the location the perfect ground for attempting the first ground truthing of the Falkland Islands interpreted soil map.

The map (see blog: Learning how to identify soils in the Falkland Islands) is one of outcomes of the TEFRA (Terrestrial Ecosystems of the Falklands – a Climate Change Risk Assessment) project and it is a very valuable dataset considering that there are very few studies of the soils of the Falklands and the most prominent goes back to the 1970's. The interpretation was by Rodney Burton, a soil specialist who has worked previously in the Falklands, on the basis of the superficial deposits described in the geological map drawn up by the British Geological Survey. In late May Rodney came to

Stanley and delivered a two week soil course funded by the TEFRA project and the result was a familiarisation with the identification of types of soils and above all a new interest in an element of the landscape that generally is not eye-catching, except in eroded areas.

The ground truthing work ended in coring locations across 80% of the island (the southernmost area and Sabina point were not visited) resulting in a total of 160 cores and describing the soil characteristic of each core such as depth, colour, texture, stoniness, and structure and mottling. Dutch and gouge augers were the tools used to extract the cores; the latter was preferred in the case of peat or very peaty soils (figures below). According to the landscape and the interpreted soil map, the cores were taken along transects perpendicular to slope and longitudinal to the valleys in order to have a good representation of changes in soil types if these occurred.



The data and description of the soils cored to different depth have been entered in a postgres database and mapped in QGIS. The last part of the work, currently in progress, is to match the soil descriptions with the soil type classification scheme adopted by the World Reference Base for Soil Resources (WRB). A simplified illustrated legend of soil types with related pictures was presented by Rodney in May and it will provide a valuable visual aid. WRB methodology for soil classification can be summarised in three steps: determining diagnostic horizons, properties and materials; allocating the soil to a Reference Soil Group; allocating principal and supplementary qualifiers. The principal qualifier are ranked from right to left in order of importance and differentiate the RSG according to the primary pedogenetic process (soil-forming factors or processes that most clearly condition the soil) that characterise soil features. The supplementary qualifiers, used in alphabetical order, are added in brackets. The two tables below offer example of a simplified guide to the WRB RGS and the classes of soils identified in the Falklands.

Falkland Islands Soil Map Legend			Soil Mapping Units (SMU		
Geological Mapping Unit (GMU) Aldiss, D.T. and Edwards, E.J. (1999) http://nora.nerc.ac.uk/507542/1/WC99010.pdf	ABBR	Land Area Total km²	Provisional Soil Legend (WRB 2014) Principle Qualifiers, Reference Soil Group (RSG) (and supplementary qualifiers)	Soil_code	%cover of Map Unit
Lowland Peat	O	28.8			
	O1		Dystric Rheic Fibric Histosols	HS-fi.rh.dy	80
	O2		Stagnic Histic Podzols	PZ-hi.st	20
Mass movement deposits (stone runs)	S	500.3			
	S1		Nudilithic Leptosols	LP-nt	50
	S2		Umbric Leptosols	LP-um	40
	S3		Dystric Leptic Histosols	HS-le.dy	10

A SELECTION OF FALKLAND ISLANDS SOIL PROFILES AND LANDSCAPES

EXAMPLE OF THE SIMPLIFIED GUIDE TO THE WRB REFERENCE SOIL GROUPS
(Source World reference base for soil resources 2014)

	RSG	Code
1. Soils with thick organic layers:	Histosols	HS
2. Soils with strong human influence –		
With long and intensive agricultural use:	Anthrosols	AT
Containing significant amounts of artefacts:	Technosols	TC
3. Soils with limitations to root growth –		
Permafrost-affected:	Cryosols	CR
Thin or with many coarse fragments:	Leptosols	LP
With a high content of exchangeable Na:	Solonetz	SN

Scale is the factor to be taken into account after the soil identification at each sample point has been completed. In fact there is a discrepancy between the scale of the interpreted map, which is at 1:250,000, and the level of detail provided by the ground truthing, which is in the order of 300-500 metres (where the coring took place the samples were taken on average at 300-500 metres). A full report will be available in early 2016 and the hope is that the results can be useful to refine the interpreted map; the methodology could be applied to other small islands; conservationists can refer to the outcomes for planning habitat restoration projects and other researchers can be inspired to carry out further investigations. We would like to thank the New Island Conservation Trust to give us the opportunity to carry out the field works and to offer the Field station facilities as base camp. Thank you to the wardens of New Island for their kindness and hospitality.