SAERI NEWS

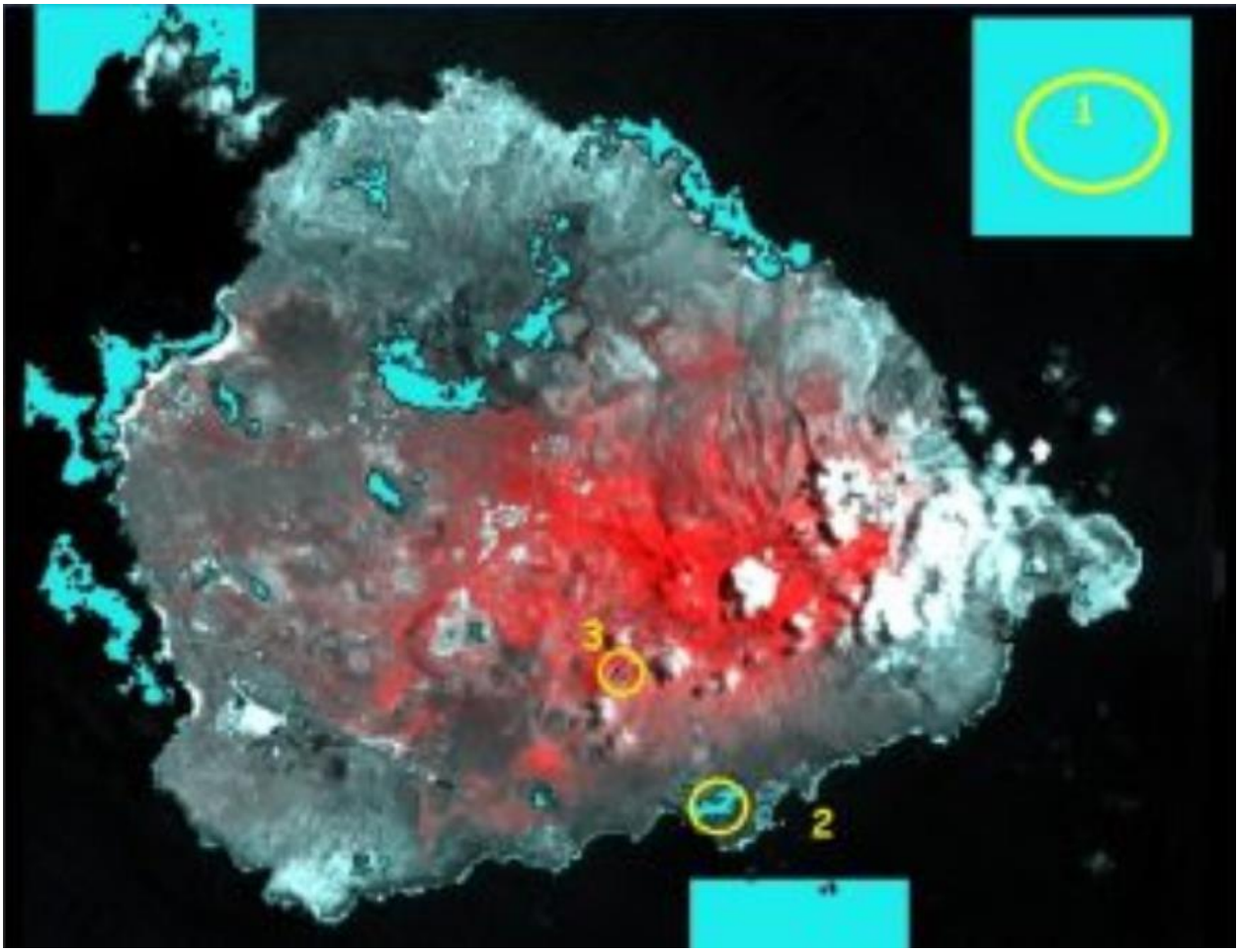
Remote sensing: the science of interpreting and identifying features from a distance.

By iLaria Marengo. First published 13th November 2015

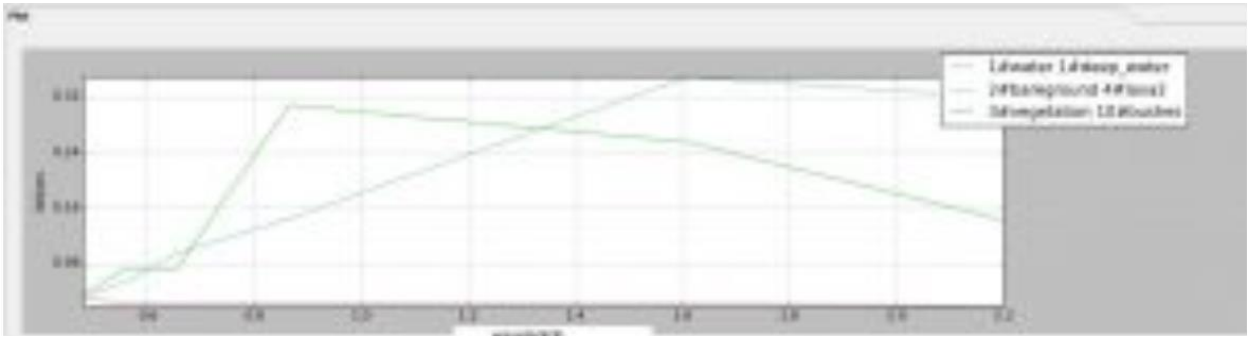
Remote sensing is the fascinating science that studies and exploits the way the light coming from the sun (or from another source, e.g. radar) is first absorbed and then reflected back to the atmosphere by the objects on the Earth's surface. Contrary to GIS, whose basic concepts are relatively simple and more "user friendly", remote sensing is a sort of "niche" discipline because it involves more physics and maths, and requires skills in image interpretation. Nevertheless, remote sensing, coupled with GIS, is a powerful tool for understanding the spatial and temporal changes of the environment and deriving useful information to support environmental policies, decisions on management planning and strategies.

From the 5th to the 13th of November, the Ascension Island Government Conservation Centre (AIG CC) hosted a training course in remote sensing as part of the capacity building supported by the Darwin Initiative project entitled "Mapping Ascension Island's Terrestrial Ecosystem". The course was run by Dr Johanna Breyer, who works at Environment Systems in Aberystwyth, and has been contracted to support AIG CC in the delivery of the Darwin Initiative project. Environment Systems is a well-established consultancy company with years of experience in the field of remote sensing and GIS analyses. Johanna's main task is the processing and interpretation of the high resolution World View 2 image (2 metre resolution) by applying a rule-based object analysis called image segmentation.

Data managers from the Falkland Islands and Saint Helena governments were invited to attend the course with the intention of becoming "intelligent consumers and users" of remote sensing tools. The aim of the course was to better understand the concepts behind remote sensing and apply them specifically to habitat classification. Central part of the course was to learn how the remote sensing analyst operates when carrying out the image segmentation and how the field surveyors proceed in determining and validating the classes of habitats on the ground and with the help of statistics. Time was spent in the office and on field trips to various locations in Ascension, with a very interesting off road traverse of Green Mountain from east to west.



False colour image of Ascension (IR, red, green) to highlight the vegetated (red) and not vegetated (greyish) land. Clouds are visible in white.



Spectral signature plot of water, bareground and vegetation. According to the signature the remote sensing analytical tools are able to identify and distinguish the objects on the surface.

There were many lessons learned from the hard job that Sam and Phil did in terms of habitat classification, for instance using systematic approach in deciding the sampling points and in assessing the habitat (use a standard density scale, consider the height of the species, carry out the assessment according to three altitude zones, etc). Similarly, Johanna provided the necessary basis to become aware of what a remote sensing analyst needs in order to set the rules for the image segmentation and extract the objects that will match the habitat classes. Interpreting a satellite image means being able to read and understand the spectral signatures that describe how the light is absorbed and reflected by the objects. In addition, ancillary information can help in identifying the objects, along with the knowledge of the local ecologist. At the end is a matter of aligning what a remote sensing analyst can extract from the satellite image and what the ecologist can see and map from the ground.

Field works on a lava flow which hosts the sooty terns

The spread of the invasive Mexican thorn bush on the slope of the Devil's Riding School

Although the rule-based image segmentation is carried out using commercial software, QGIS, the open source software being used across the South Atlantic overseas territories, provides a series on interesting plugins, such as Semi-Automatic Classification and Orfeo tool box, which can be used as starting tools for unsupervised/supervised classifications and for practising what was learnt at the course. Furthermore, free Landsat images offer the opportunity to perform spatial/temporal analyses in QGIS and detect land cover changes which affect the territories.

An important outcome of the course was talking and drafting best and standard practice for habitat classification with the use of remote sensing and ecological knowledge that can be applied across the South Atlantic UKOTs. In fact, the goal is to transfer what has been achieved in Ascension to projects that will be run in Saint Helena and the Falklands in the future.