

# APEX OSD Ground Truth



University of  
Zurich <sup>UZH</sup>



**vito**  
vision on technology



measurements | products | policy



## Key Facts

Issue 1.0

Date	2011-06-26
Time	+ - 1 hour of image acquisition
Altitude	Ground
Number of targets	6

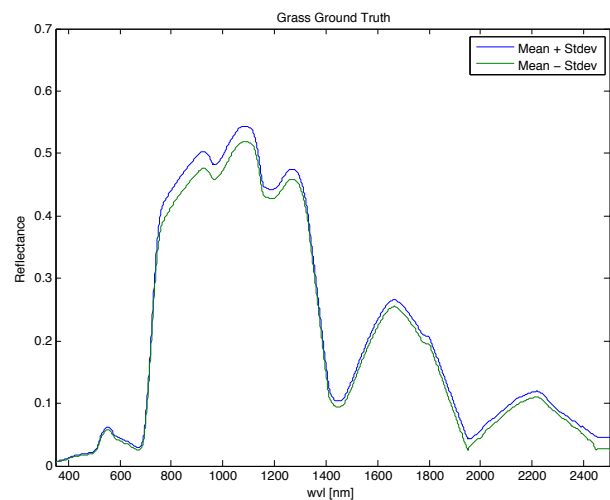
Sampling instrument	ASD FieldSpec 3
Units	Reflectance (HCRF)
File format	ENVI ROI & MODTRAN Spectral Albedo
Spectral coverage	350 - 2500nm

## Overview

Ground truth for the APEX Open Science Data Set [1] was acquired on the day of the overflight within a two hour window centred around the nominal imaging time.

Data were acquired with an ASD FieldSpec 3 spectroradiometer operating in radiance mode. Data acquisitions per target consisted of 5 reference panel readings, 30 target readings acquired at nadir at a distance of 1m off the ground followed by another 5 reference panel readings.

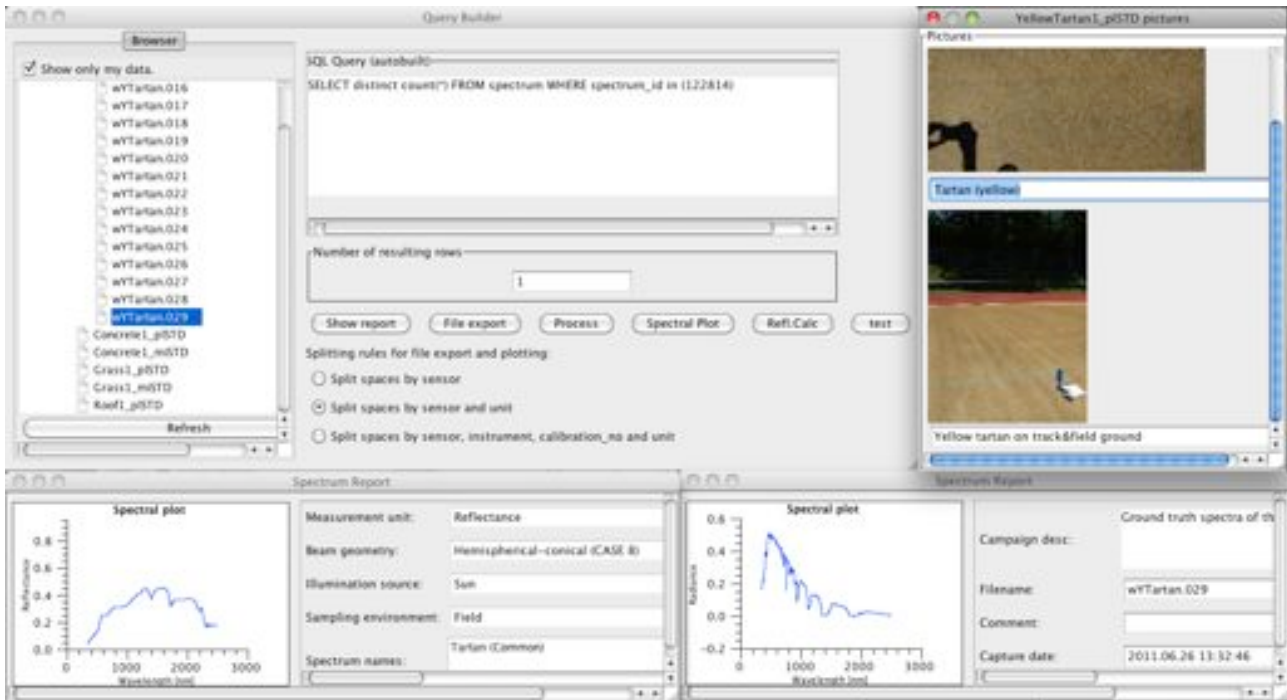
These data were then post-processed to produce HCRF data by applying a linear irradiance estimation over time. Water vapour absorption bands were interpolated to remove the noise. First and second order statistics were calculated for the individual spectra of each target. The final data consists of two spectra per target, representing the mean spectrum plus/minus the standard deviation respectively. These mean and standard deviation based spectra characterise the variability of the ground target and help to judge the range of APEX HCRF data values observed on the target. The spectral data are available as MODTRAN input file format.



Spectra of the grass target

Positions of the spectral ground references in the RAW image geometry of the APEX OSD are defined by regions of interest (ROI's) supplied as ENVI ROI file. Both the spectral and ROI files can be downloaded from [www.apex-esa.org](http://www.apex-esa.org).





**SPECCHIO Interfaces showing the yellow track&field surface data**

The spectra are also available in the SPECCHIO online spectral database, augmented with additional metadata [2]. These metadata include as well all target photos.

In addition to the processed HCRF files, SPECCHIO also serves the raw radiance data files, allowing the interested users to explore the changes in irradiance over time and apply their own HCRF retrieval algorithms.

To access the SPECCHIO database, browse to [www.specchio.ch](http://www.specchio.ch), open a user account and use the SPECCHIO Java application to select your data, inspect the metadata and download spectral data and metadata as ENVI spectral library or CSV file. Direct data access is possible from Matlab and Python languages as well as any other language offering Java bridging. For further details please visit the SPECCHIO website.

## References

- [1] A. Hueni, S. Sterckx, M. Jehle, P. D'Odorico, K. Vreys, B. Bomans, J. Biesemans, K. Meuleman, and M. Schaepman, "OPERATIONAL STATUS OF APEX AND CHARACTERISTICS OF THE APEX OPEN SCIENCE DATA SET," in *IGARSS*, Munich, 2012.
- [2] A. Hueni, J. Nieke, J. Schopfer, M. Kneubühler, and K. Itten, "The spectral database SPECCHIO for improved long term usability and data sharing," *Computers & Geosciences*, vol. 35, pp. 557-565, 2009.

## Contact

The APEX team is happy to receive questions and feedback which are kindly to be addressed to [apex@apex-esa.org](mailto:apex@apex-esa.org)

### APEX Science Team

Michael E. Schaepman  
Remote Sensing Laboratories  
University of Zurich  
Winterthurerstrasse 190  
CH- 8057 Zürich

### APEX Operations Team

Koen Meuleman  
VITO – Center for Remote Sensing  
and Earth Observation Processes  
Boretang 200  
B-2400 Mol

### APEX Website

[www.apex-esa.org](http://www.apex-esa.org)