Recommendations from

WGCV-23 and WGCV-24

to the 19th CEOS Plenary

Recommendation 1

Background

Global land cover maps at coarse resolution pose significant problems for accuracy assessment because of the high frequency of mixed pixels, difficulty in precise geolocation of map products and reference materials, and logistical difficulties associated with field data collection. Validation of land cover is critical in that without proper validation, land cover maps can be misleading.

WGCV Requirement

Produce land cover maps that integrated and utilize the complimentary efforts of the GOFC/GOLD Land Cover Implementation Team's effort to coordinate land cover reference data.

Recommendation

Request all CEOS members that produce land cover maps to use CEOS Land Validation Core Sites and either use the FAO/UNEP Land Cover Classification System (LCCS) or relate their legends to the FAO/UNEP LCCS.

WGCV Follow-up activities

The LPV, in conjunction with the WTF, will expand their core validation sites to encompass new sites of interest to contributing CEOS members and will develop a proper statistical sampling strategy to maximize use of non-randomly selected sites to derive accuracy figures.

Recommendation 2

Background

It has been agreed by CEOS agencies that global DEMs employed for radiometric and geometric processing of their spaceborne data should preferably be sourced from spaceborne sources of DEMs.

WGCV Requirement

To be able to utilize these spaceborne DEMs, a full error characterization is required which should include inter-comparisons with *in situ* validated data as well as inter-comparisons with other DEM sources (spaceborne and airborne) all of which should be intrinsically and verifiably more accurate.

Recommendation

Request that CEOS participating space agencies provide any and all internal quality metrics (e.g. Terrain Height Error Data) or external validation information via a web-link on each product page. In addition, the CEOS participating space agencies should provide a moderated "Known Issues" page in a similar fashion to the one produced by MODIS at http://landweb.nascom.nasa.gov/cgi-bin/QA_WWW/newPage.cgi?fileName=terra_issues

WGCV Follow-up Activities

The TMSG, in conjunction with the WTF, will provide an example set of results for external validation information as well as a few “Known Issues” for some sample DEM datasets. The TMSG will liaise with WGISS about the creation of the “Known Issues” pages for DEMs.

Recommendation 3

Background

Global cartographic data, derived from existing spaceborne datasets are an unique resource for mapping the "state-of-the-planet". The optimum method for providing such data is through the use of OGC standards which web browsers around the world can recognize and use directly within Web Map Server browsers. Global orthorectified and mosaiced products have a number of helpful applications regarding image geocoding, change detection and scene interpretation.

WGCV Requirement

There is a need for CEOS participating space agencies to provide such cartographic and image map data, either generated within the agency or via third parties in OGC-compliant formats (e.g. ARC shapefiles, GML for vector data and geotiff for image map data).

Recommendation

Request that subsidiary products (such as orthorectified SAR amplitude mosaics and water body masks for SRTM) produced by CEOS participating space agencies be made available as OGC-compliant data layers (WMS/WCS/WFS formats) for use in understanding and interpreting the data and for quality control of orthorectification and geocoding of any spaceborne dataset.

WGCV Follow-up Activities

The EO Data Portal project, ICEDS, will provide a demonstration of the utility of vector data derived from SRTM and it's inter-comparison with other public domain coastline and water body datasets.

Recommendation 4

Background

SAR subgroup has established a natural, homogeneous and international site in the Amazon Rainforest for radiometric calibration of SAR systems. The coordinates of the site are: UL: -5.03, -65.67; LR: -9.12, -69.64 deg. There is a strong need of a common man made calibration site with point targets (corner reflectors, transponders etc.) for use by different SAR missions. However, due to lack of funds, no common man made site has been built yet.

WGCV Requirement

It is important that data collected from different SAR satellites are intercomparable for absolute radiometry and therefore proper calibration is required using common reference targets.

Recommendation

Encourage CEOS agencies to use an international site within the Amazon Rainforest with coordinates of (UL: -5.03, -65.67; LR -9.12, -69.64 deg) as one of the radiometric calibration standards. In addition, encourage CEOS agencies to support efforts by the WGCV SAR subgroup to establish and maintain a common man made calibration site for use by different SAR missions.

WGCV Follow-up Activities

The SAR subgroup will acquire and analyse image data over the international site. The results will be presented and discussed at annual SAR workshops and it would be published in the workshop proceedings. The next SAR workshop will conduct activities and coordination required for establishing a man made calibration site.

Recommendation 5

Background

CEOS WGCV notes the growth in number of optical satellite sensors, and the diversity of their spectral and spatial characteristics. It notes that these sensors have been deployed, to meet the needs of both scientific and commercial applications and that the near "operational nature" of data provision from such sensors means that increasing reliance is put on the integrity and reliability of EO data, by governments, international agencies and the commercial sector.

It further notes:

- The needs of the GEOSS identified societal themes for data of guaranteed quality and long term reliability
- that much of this data will soon be the result of, synergistic combination of the products from more than one instrument and often more than one agency.
- that difficulties associated with both pre-flight calibration and more importantly "transference into orbit" means that unacceptably large biases between instruments (even on the same platforms) regularly occur requiring significant corrections to be applied.
- existing strategies for in-flight calibration can provide good long-term stability but not necessarily absolute accuracy, which is required to establish a reference baseline for long-term climate change studies and to secure such records for future generations.
- the specific activities identified in the recently developed strategy document on inter-satellite calibration prepared by WMO.

Recommendation

WGCV recommends that CEOS agencies ensure that all satellite pre-flight calibration activities should include not only an "end to end" system calibration but also of all appropriate sub-system components, and that these should all be made demonstrably traceable to SI units.
CEOS agencies should be encouraged to use SI traceable "benchmark" radiometric reference targets viewable by space based EO sensors to unequivocally quantify and remove biases between optical sensors. Such targets would probably include the Moon, Sun and a number of ground sites e.g. Deserts used by existing missions.

WGCV Follow-up Activities

In response to this recommendation by IVOS raised at the IVOS workshop and Committee meeting 14, ESA has undertaken a study activity developing a so-called Cal/Val Portal addressing the common format for information exchange on instrument characteristics, reference methodologies for radiative transfer procedures and vicarious calibration methods and associated metadata.

Recommendation 6

Background:
It has previously been agreed that spaceborne DEMs will be used preferentially for georadiometric processing of other EO data products. The existence of ACE and SRTM global DEM products is acknowledged. Current georadiometric processing at NASA uses non-EO data sources of dubious quality containing many artifacts. Current georadiometric processing at ESA uses an unvalidated DEM (GETASSE30)

WGCV Requirement:
Spaceborne DEMs should only be used for georadiometric processing if, and only if, their errors and artifacts have been fully characterised and documented.

Recommendation:
*CEOS recommends **all** member space agencies consider using **validated space-based** DEMs for georadiometric processing of EO data products. CEOS further recommends that quantitative evaluation of spaceborne DEM products be performed and published as part of any future web infrastructure for validation.*

WGCV Follow-up Activities:
TMSG offer to provide, with suitable resourcing, the error characterisation required of these spaceborne DEMs as well as examples of "Known Issues" with downstream products caused by errors in the DEMs used for georadiometric processing.