

CEOS WGCV Dresden Meeting DEM Breakout

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Review of day 1 slide recommendations

So what's the problem/opportunity?

- Setup a task team entitled “Global DEM for georadiometric correction of EO data”
Need to quantify the precise geometric and radiometric requirements for EO sensors for 10-15m, 30m & 90m DEMs
- Need to assess whether spaceborne DEMs will be “fit for purpose” and whether CEOS users need “bare earth”
- This will require a study focused on simulation of the geometric & radiometric requirements
- Need to quantify the error characteristics of the different candidate DEM sources in a much more thorough fashion than previously done
- Need to be able to display the information content of each DEM source as well as perform inter-comparisons between them and against other independent sources such as RA, ICESAT, higher-resolution EO-DEM (e.g. PRISM, TerraSAR-X stereo) and national mapping sources (e.g. DEMqis)

Global DEM breakout

For images of GSD > 250m, need a publically available, open license solution

- **recommendation that GMTED2010 be used for coarse resolution sensor geometric and radiometric calibration (9.250m grid-spacing)**
- **add cross-references on the WGCV web-pages to this GMTED2010**
- webGIS/DEMqis seen as the best way of demonstrating the quality
- use citizen science, as well as existing structures such as GeoCache for future validation

Global DEM breakout

For 30m < GSD < 250m, nothing available that has been validated and cannot recommend a baseline solution for global DEM

- There is an existing publicly available 90m DEM, SRTM3 v3.0 (data fusion of ASTER+SRTM)
- Unless and until the SRTM v3.0 is validated, we cannot recommend any global DEM for 30m < IFoV ≤ 250m,
- It is likely that we will eventually require a 30m DEM with bare earth DEM

- There must be a consolidated plan to validate SRTM v3.0

- When do we know the job is done
 - The data providers (USGS for ASTER GDEM v2.0 and JPL for SRTM) should deliver validation & data quality statements including for areas where ASTER has been employed to fill in gaps in SRTM and vice versa.
 - USGS and NASA JPL quality and validations of the product
 - DRAGON for China evaluations, ESA-QA4EO for European, US for other areas
 - Need 22-26 June Switzerland – Crippen and Gesch to be invited from JPL and USGS

- Potentially use webGIS/DEMqis as the best way of demonstrating the quality
 - Known unknown – will 3 arcsec 90 meter Tandem be available for browse display?
 - Discussion related to Tandem X 90 meter DEM discussion is needed, also potential use of gap filling Tandem X 30 meter DEM
 - NASA DEM will not be available in 2017. Need to check if this will have uncertainties

Global DEM breakout

- What does Sentinel-2 use?
- for Landsat-8 processing, USGS use a 1 arc-second DEM based on SRTM1 and filling in gaps from other assets. Need to discuss options with USGS Jim Storey and Dean Gesch for any new work in this area

Here is what Landsat uses. **Standard Terrain Correction (Level 1T)** - provides systematic radiometric and geometric accuracy by incorporating ground control points while employing a Digital Elevation Model (DEM) for topographic accuracy. Geodetic accuracy of the product depends on the accuracy of the ground control points and the resolution of the DEM used:

- Ground control points used for Level 1T correction come from the [GLS2000](#) data set. DEM sources include [SRTM](#), [NED](#), [CDED](#), [DTED](#), and [GTOPO 30](#)

Global DEM breakout

- **Very high resolution sensors ($GSD \leq 5$ meter) have the need for ≤ 30 meter DEM, many sensors in CEOS, but a global solution is not available.**

- JAXA option? TanDEM-X?
- Others options in the future?
- Recommend ideas and support from CEOS members.

- **Crowd-sourced DEM**

- Would Google corporation be interested in supporting such a crowd-sourced validation/ quality assessment using android phones?

- WGCV address and develop roadmap
- OpenStreetMap as a source of 3D locations
 - WGCV TMSG (JPM) look into this
- Crowd-sourced global cellphone locations
 - Potential approach to cellphone company level database information
 - Secondary option to Google android approach
 - Also to be discussed in WGCV Roadmap