Planetary FITS
FITS standard for planetary data?

C. Marmo

UMR 8148 GEOPS
Université Paris Sud 11 - CNRS

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FITS standard for planetary data? Why?

- open, well defined, scientific graded standard
- a lot of open source well proven tools to analyse and manipulate it

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FITS standard for planetary data? Which data?

First (this presentation)
- High level Imagery: projected surfaces.
- Surface properties maps (Topography, Temperature, ...): projected rasters.

Then
- Spectral cubes
- Tabular data

Maybe
- Raw data

FITS format is not incompatible with metadata PDS archiving: e.g. Hubble Mars images (http://pds-geosciences.wustl.edu/missions/earthbased/hst_cornell.htm)
FITS standard for planetary data? Projections. I.

Answers are in the classics:


No need for oblique projections definitions: difference is in the projection parameters (projection center or reference point)\(^2\) e.g. Mercator and Transverse Mercator, Simple Cylindrical and Equirectangular.

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FITS standard for planetary data? Projections. II.

Projection translation from ISIS (http://isis.astrogeology.usgs.gov/) to FITS.

- sinusoidal: SFL (spherical and ellipsoidal, Snyder p.243), CRVALi in FITS WCS is the center longitude in ISIS-PDS standard.
- lambertazimuthalequalarea: ZEA (spherical and ellipsoidal, Snyder p.182) CRVALi in FITS WCS is (center longitude, center latitude) (like all zenithal projections)
- lambertconformal: COO (spherical and ellipsoidal, Snyder p.104).
- equirectangular: CAR (only spherical in ISIS, parallels and meridians are straight and orthogonal everywhere)
- mercator: MER (spherical and ellipsoidal, Snyder p.38).
orthographic: SIN (spherical and ellipsoidal, Snyder p.145), CRVALi in FITS WCS is the (center longitude, center latitude) in ISIS-PDS standard.

pointperspective: AZP (spherical and ellipsoidal, Snyder p.169) CRVALi in FITS WCS is (center longitude, center latitude) (like all zenithal projections)

polarstereographic: STG (spherical and ellipsoidal, Snyder p.154) CRVALi in FITS WCS is (center longitude, center latitude) (like all zenithal projections).
References

FITS standard for planetary data? Peculiarities.

- ellipsoidal projections: defining planetary RADESYS
- keyword for datum (surface reference): RADESYS containing radius?
- CUNIT : meters and degrees, alternative Coordinate Systems are already described in FITS
- distortions are due to topography not only optics: no polynomial description of distortion in no orthorectified images.
