Sentinel-2 for environmental resources in Tunisia
first results with L2A data


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Abstract: Tunisia was selected in the framework of the THEIA-CNES project in 2015 for production of Sentinel2 L2A images. This project gathered seven proposals in Tunisia with partnerships between tunisian and french teams. All Tunisia is covered except desert. We propose to present an overview and the first/ or preliminary results obtained by the different partners. The thematics involved are: agriculture, water resources, soils and forests. Most of these first using of S2 data are focused on research objectives according to the proposal. The main results concern: land cover mapping, crop practices, biophysical parameters inversion, in mediterranean sub humid climate in the north (cereals, forests, humid areas) to semi arid conditions (irrigated and rainfed crops) in central Tunisia and arid conditions in the south (oasis, olive trees). First results with combination of Sentinel-2 and Sentinel-1 are presented. The multitemporal capacities of S2 data are not always valorized because some thematic don’t justified frequent images (forest mapping, oasis). Other reasons are the difficulties to download data with low level internet connections and difficulties to use a large flux of satellite data with suitable tools. Applications at national level are now considered.

Oasis systems studies and difficulties to use a large flux of satellite data

Detection of burned forests (northern Tunisia)

Forest mapping

Biophysical parameters of annual crops (Cap Bon)

Mapping of irrigated/rainfed crops in Bou Salem and Sidi Bouied areas

Quick changes of water surfaces and volumes: small dams, sebkha, (Merguellil)

Anthropic landscape and oasis

Cereals, yield, R. Abdelfattah & al. work in progress.

Olive trees properties with Sentinel-2 and Planet data

First results for Elbna sebkha: "Comparison between Sentinel-2 A&B data vs Landsat 5-8.

Satellite data Soil parameters Vegetation

Biophysical parameters of annual crops (Cap Bon)

Soil moisture mapping (Merguellil)

Seasonal filling of Joumine and Sidi Salem dams

Land use/land cover and early detection of agricultural crops (Merguellil, Jendouba)

Olive trees properties with Sentinel-2 (production and detection of diseases, Sfax)

Comments

The ready to-use Sentinel2 L2A products and high spatial resolution are first appreciated by thematic users for various applications. New modes as remote access to extract and produce data are expected to increase the use of Sentinel2 time series and training courses are to be planned for researchers, and endusers at national and regional levels. This poster reflects first results of the initial THEIA-L2A proposal for Tunisia, other studies using the S2 L2A products are not mentioned here.

Acknowledgments

THEIA and CNES, USGC, ANR AMETHYST, ALMIRA, PMH Uqra et Maghreb, TOSCA/CNES, GISMOD/MAISTRAL, LMI NAÏLA (IRD-MESRS Tunisie)

Publications (to be completed)


R. Kallel et al. Monitoring of surface soil moisture based on optical and radar data over agricultural fields, 4th International Conference on Advanced Technologies for Signal and Image Processing (ICASIP), Athens 24–26, 2018, Swaz, Tunisie.


Z. Kassouk, Z. Lili Chabaane & al. Seasonal changes in vegetation over the Merguellil plain, TOSCA A-MUSE, on-going work.

Winter land cover map nov 2016- mai 2017, Merguellil plan, classification by decision-tree

Early detection of winter cereals and summer crops: plowing intensity, sowing detection (2018)

Z. Lili Chabaane, Z. Kassouk, B. Mougenot & al.

The maps show the spatialisation of soil moisture derived from the inversion approach.

An inverted equation from the WAC model calibrated with ground data, was used to map soil moisture using SAR and optical images over the study area.

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