

Earth observation product for agricultural water use estimation in Mediterranean basins:

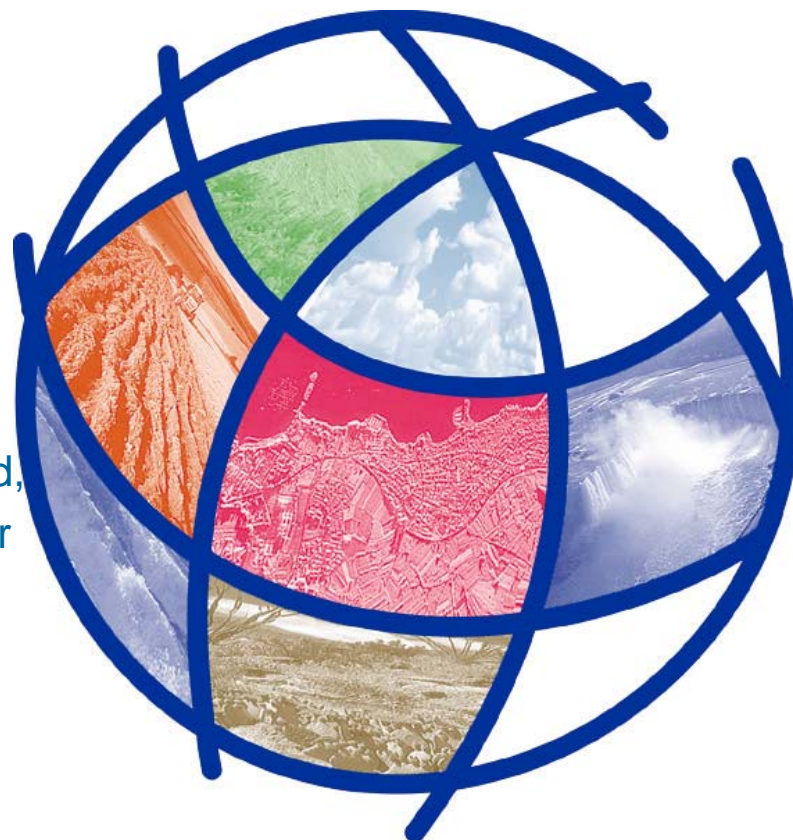
Experience of the Greek User

Dr. Eleftherios Stavrinou

Hellenic Ministry of Rural Development and Food,
Directorate of Water Reclamation and Soil-Water
Resources Planning

Athens, Greece

e-mail: estav2@yahoo.gr



Service Provider:

Aristotle University of Thessaloniki (GR)

T.Alexandridis, I.Cherif, Y.Chemin, and N.Silleos



- Agricultural water use is estimated to exceed 70% of freshwater consumption in the Mediterranean and over 80% in Greece
- Precise information necessity for water managers, and farmers level only available for large regions, and estimations for areas with or without organized irrigation network systems
- the WFD demands of water balance pressures from agriculture with the overall aim to recover the costs of water services, including environmental and resource costs
- A crucial step in this direction is the knowledge of the water used by agricultural crops



- **Presentation of the user and user needs**
- **The service (non technical) advantages from this service as compared to existing processes**
- **Results (2 areas)**
- **Training**
- **Assessment of service**
- **Benefits for the user**
- **Potentials other users and applications**
- **Future outlook continuation to use the service, potential to buy the service and promote the service to other users**



Water Resources Planning (Athens, Greece) authorities

Our work includes :

- Plan common irrigation networks for the development of water resources use, such as reservoirs, dams, irrigation and drainage networks, etc.
- Carry out studies for irrigation water management participate with national and local stakeholders in water resources management and decision making
- Participate with other relevant authorities in water management negotiations for transnational river basins

User's role within GSE Land



- Define the requirements and “shape” the product
- Provide available datasets
- Provide validation (reference) datasets
- Evaluate the product

All these are described in a Service Level Agreement that we have signed

The Service: “WU1.1 Agricultural water use”



A product for operational monitoring of agricultural water use in a Greek river basin

➤ **Product features:**

- Height of water used by irrigated agricultural areas, per spatial cell of analysis (pixel and/or irrigation district),
- per unit of time (irrigation season and/or month).
- Thematic accuracy: > 80%
- Applicable in various Greek river basins
- Operational methodology, user-friendly application

➤ **Methodology:**

Based on the estimation of actual evapotranspiration (ETA) solving the surface energy balance algorithms (SEBAL), using satellite images in visible, infrared and thermal spectrum, few daily meteorological data from local station



➤ Existing methods:

- water use estimate based on modified Penman-Monteith its customisation to Greek conditions is based on old measurements (pre 1987)
- its validity is compromised by too many assumptions

➤ Advantages of new methodology:

- Spatially distributed results (thematic maps that cover the basin)
- High accuracy of information (takes into account the growing conditions of plants and actual water availability)
- Easy operation, low cost input data



2 sites:

- Strimon river plain (cultivated area: 1123km²), largest irrigation network in Greece
- Nestos river plain (cultivated area: 319km²), variability of irrigation methods with no data measurements



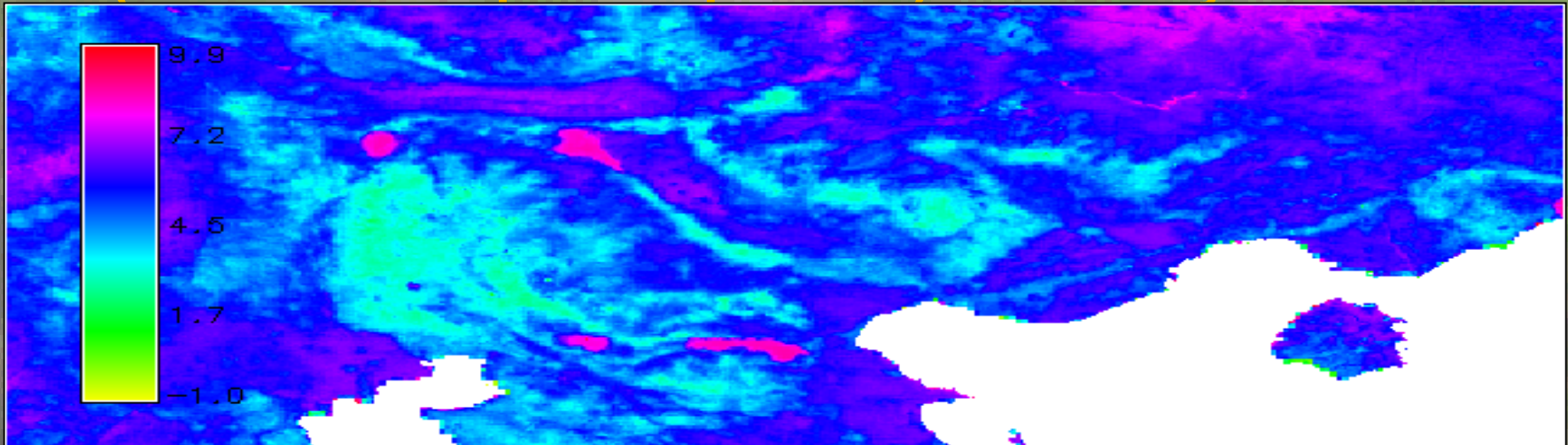
Deliverables:

- thematic maps of water use (mm per season per pixel)
- tables with statistics (water use per irrigation network per month)

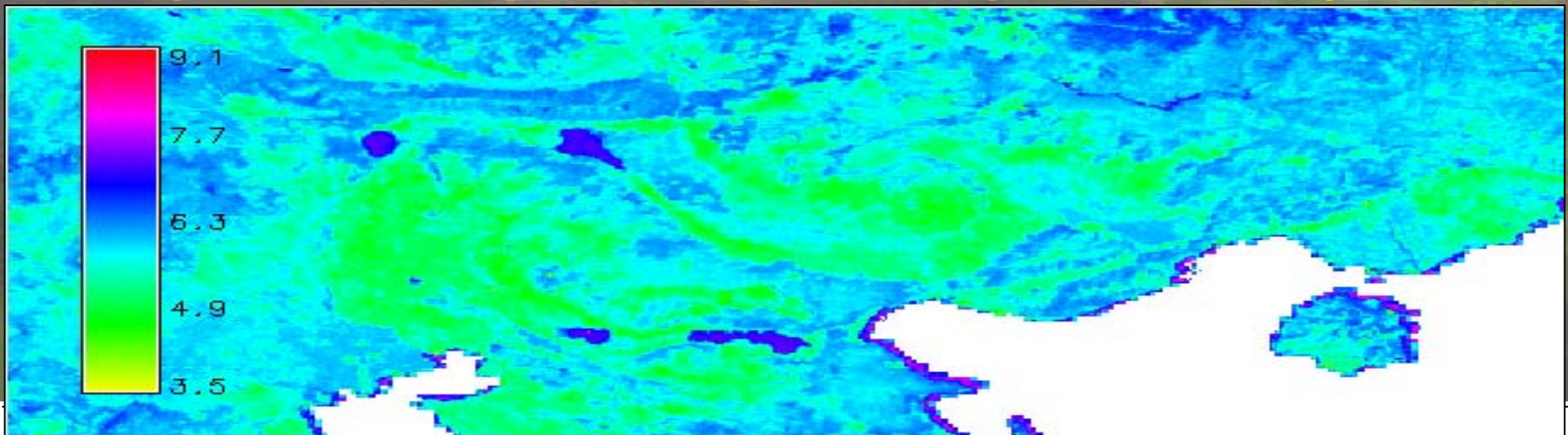
Some results



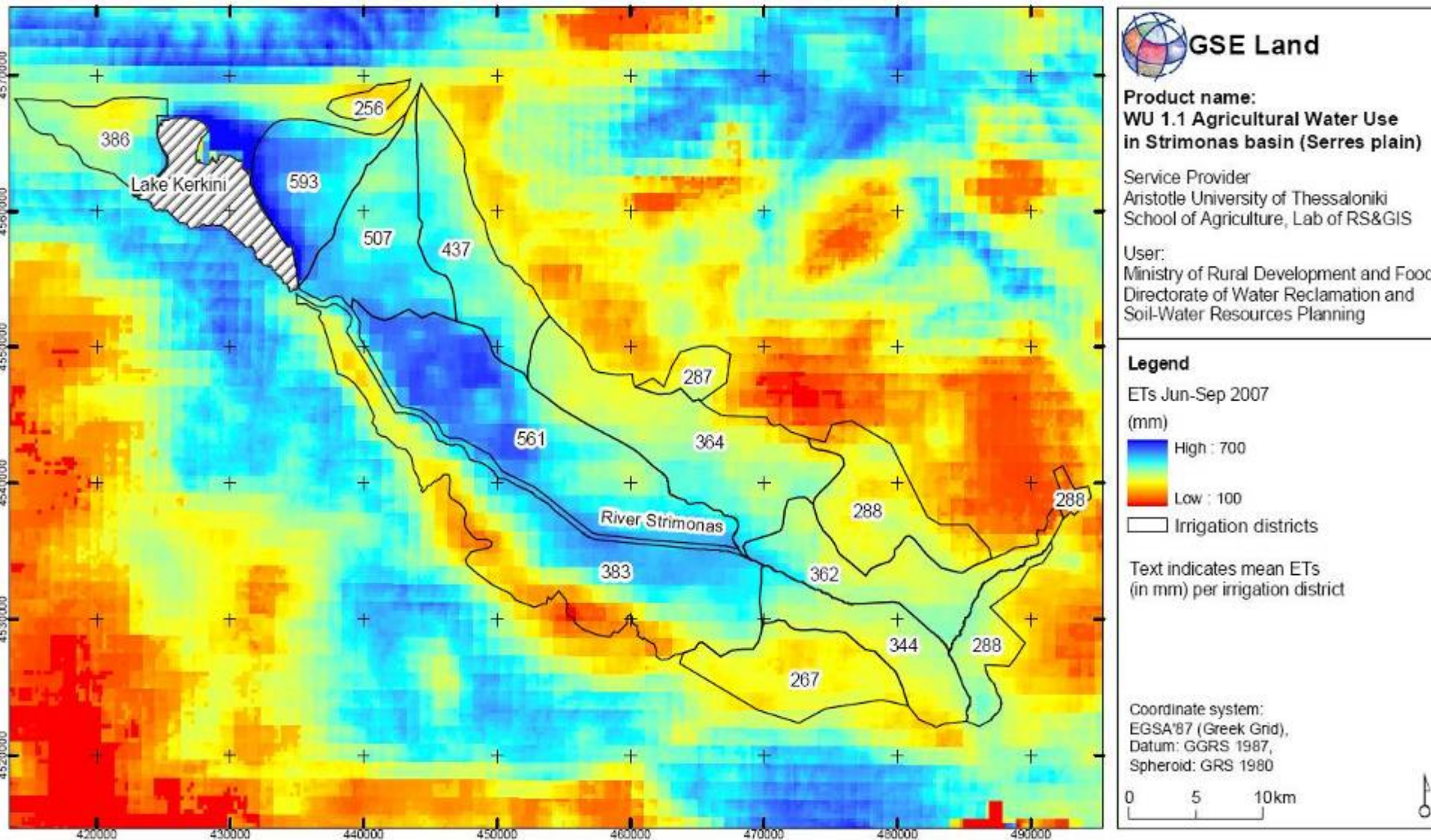
ETo (reference evapotranspiration) for 28 July 2007



ETa (actual evapotranspiration) for 28 July 2007



Seasonal evapotranspiration 2007 (~ agr. water use)





1 day event : presentation and hands-on application
trainees:

- **variable levels of trainees: technicians – supervisors from same thematic field and similar working sectors**

materials given:

- **training material**
- **customized software with installation instructions**
- **data sources and links**
- **demo data**





Methods of assessment:

- Visual assessment for credibility, according to our experience
- Compared against results from similar studies
- Questionnaire for service utility report

Evaluation: Covers the requirements:

- thematic accuracy, covers large areas, useful format
- Can be applied to other Greek basins
- No shortcomings identified
- Very positive, overall



- **Knowledge increase related with the actual irrigation water demand in extend water network districts**
- **Contribution to irrigation networks planning, development and maintenance investment analysis**
- **Support of suitability regional services about the WFD 2000/60/EU implementation duties in relation to quantitative parameters of water resources**
- **Contribution to water management plan development and measures of irrigation water saving in river basins**

Potentials for the user



- **Can be implemented in our workplan
estimated time: 2-3 years**
- **Collaboration with other users**
 - Regional Water Direction**
 - Central Water Agency**
 - Ministry of Environment and Public Works**
- **Determine other implementations of the final product
use the service to drought and flood conditions**



To define more accurately agricultural water use parameters in large river basins



To define more accurately agricultural water use in large irrigation networks



To define the beneficial agricultural water use with crop coefficients calculation
(Kc: crop water irrigation requirements)



- continuation to use the service with information from all the involved organizations of river basins protection potential to buy the service
- promote the service to other users to assess policy impact and effectiveness for common prevention measures



Thank you for your attention !!

