Evapotranspiration forecast using SWAT model and weather forecast model

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Aquapath-soil
Service to support agriculture production
Project financed by:

European Space Agency
Objective

• Create a service with a daily prediction of irrigation needs based on
  ▫ Weather forecasts
  ▫ Hydrologic models
  ▫ Vegetation models
  ▫ LAI measurements made by satellite
Study area presentation

- Six users were considered
- Each user can have more than one corn field
Users feedback

- Methodology / product more competitive
- Information sets appropriate and compatible with the rest of the tasks ongoing and planned in the organizations
- Product provided will support the work that your organization carries out
- No significant shortcomings stopping the service to be used
Products/Service delivery

- SMS
- Website project
SMS Service

Download of meteorological values (measurements and forecast)

Simulation with SWAT-MOHID

Results saved in database

**SMS Information**

**Meteorological Information** (previous week and forecast to the next week)

**Actual Evapotranspiration** (previous week and forecast to the next week)

Send SMS

Automathic SMS sent to the user
Model input

- **Meteorology** local daily values of pcp, temp, HR, wind, radiation.
Model input

• **Topography** – SRTM – 22 m
Model input

• **Land use:** data from land use of 2006 with detailed farmers map
Model input

• Portuguese soil map (1 : 25 000)
Evaluation of ET0 (Alfalfa)

- SWAT ET0 results compared with standard FAO56
Different meteorological stations

- Impact of using different meteorological stations on ETo (Paul de Magos – ARBVS and Baragem de Magos – SNIRH)
## Evaluation of forecast

<table>
<thead>
<tr>
<th>Week</th>
<th>Initial Date</th>
<th>Next Week (model forecasts)</th>
<th>Previous Week (user estimations)</th>
<th>Difference</th>
<th>% of Difference</th>
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<tbody>
<tr>
<td>1</td>
<td>19-07-2010</td>
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<tr>
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<td>51</td>
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<tr>
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<td>23-08-2010</td>
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<tr>
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<tr>
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<td>29</td>
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<tr>
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<td>5</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Irrigation vs Prediction

Irrigation = 549 mm

Prediction = 456 mm
Conclusions

• Service to send SMS with the SWAT results was implemented and we got good feedback from users.

• Estimations of actual evapotranspiration allow a reduction of 20% in irrigation water.

• ETo from SWAT shows small difference from FAO56 equation.
Sub basin example

• José Núncio Farmer field – test user
Sub basin example

- Location of José Núncio field – farmer in Sorraia Valley
Sub basin example

- Soil Type: A — Aluviosoils with median texture
Sub basin example

- **Land use:** Corn