Contribution of low resolution data to African savannas characterization

Valéry GOND
Forest department of CIRAD
Cayenne – French Guiana
Context and Objectives

- In the context of international programs to understand the atmosphere-biosphere interface to model climatic changes.

- Needs at a global level of information about surface parameters as surface roughness, land cover, water availability, phenology, etc.

- The objectives of this study is focus on:
  - the land cover characterization
  - the spatial distribution of ecosystems.

- The focus is done on the savannas and specially the west african savannas.

- The study is done with low resolution remotely sensed data.
Material and Method

Low resolution
Time serie

Classification

High resolution control

Structure cover
Phenology
Fraction cover

Ground knowledge
Data processing

1. Row data

2. Spectral calibration
   Atmospheric correction

3. Temporal smoothing

4. Classification input
Classification model
Continental results
Focus on the experimental transect

- Latitudinal gradient in west Africa
- Transect along savannas types
- Ground station for measurements

Site 1: Hombori
Site 2: Bidi-Banh
Site 3: Bondoukuy
Site 4: Ouango
Site 5: Lamto
Validation on Savannahs

5 - Open grassland steppe

Bidi-Banh (Burkina) site n°2

7 - Open shrubland steppe

Bondoukouy (Burkina) site n°3

11 - Open woodland savanna

Lamto (Côte d’Ivoire) site n°5

20 - Open forest woodland savanna

Ouango (Côte d’Ivoire) site n°4

- Field knowledge
- High resolution imagery
- Maps and ground station
Temporal monitoring - Phenological parameters

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photosynthetic activity</td>
<td>40,5</td>
<td>39,5</td>
</tr>
<tr>
<td>NDVI amplitude</td>
<td>0,31</td>
<td>0,33</td>
</tr>
<tr>
<td>NDVI maximum</td>
<td>0,74</td>
<td>0,74</td>
</tr>
<tr>
<td>Cycle beginning</td>
<td>12</td>
<td>12,5</td>
</tr>
<tr>
<td>Maturity duration</td>
<td>23</td>
<td>18,5</td>
</tr>
<tr>
<td>Senescent start</td>
<td>43,5</td>
<td>41,5</td>
</tr>
</tbody>
</table>
Development

- Utilization of new sensors with better spatial resolution.

- Global data base for time series (Spot-VEGETATION, MODIS).

- Improvement of the ecosystems definition.

- Improvement of the phenological detail (daily data).
Development

- Ecosystems characterization using 1km resolution time series.

- International programs for a global coverage and harmonised legend.

- Better understanding of spatial distribution.

- Improvements of phenological parameters.

- Global perception of the savannas ecosystems.