



## Template product information package

<b><u>Product</u></b>	<b>Burnt Area</b>
<b><u>Participant ID</u></b>	<b>JRC</b>

### 1. **General Information**

The burnt area product has already been developed by Jean-Marie Grégoire's team. Ten-day estimates of areas burned at global level, with a priority on the African continent, as derived from burnt area maps produced using the medium resolution VEGETATION S1 satellite imagery are available.

### 2. **Application of the product**

The product can be used for sustainable management of natural resources in Africa, with particular emphasis on forest resources and biodiversity resources. The knowledge of burnt areas is useful for rainfall predictions, with particular emphasis on the monsoon dynamics in Africa, estimates of greenhouse gases and aerosols emissions from biomass burning, and assessment of biomass burning impacts on air quality around urban areas, with particular emphasis on health impacts.

The proposed product is improved compared to existing continental scale burnt area products (GLOBSCAR derived from ATSR data, GBA2000 derived from VEGETATION-S1 data and GLOBCARBON, derived from a combination of ATSR and VEGETATION-S1 data). With regard to GLOBSCAR, the proposed product is based on a series of regional algorithms i) which have been optimised for specific ecosystems, ii) which have been validated and iii) which are fully documented. With regard to the GBA2000 the proposed product is a 10-day burnt area product, while GBA2000 is a monthly product. With regard to GLOBCARBON product, the proposed product is based on a set of algorithms which are fully validated, documented and developed for specific ecosystems, while the GLOBCARBON product is based on a mixture of a series of algorithms on which the end-user has little or no vision.

- the proposed product can be near real time, but not true real time, as the algorithms require to accumulate imagery for a 1 month period, on average
- the frequency could be 10-day at continental scale but known to be problematic in the dense humid forests of the tropical areas.

Candidates are already identified for the operational use of the proposed product. Personal contacts do exist with all of them:

- Laboratoire d'Aérodologie, Toulouse, France (Dr. C.LIOUSSE). Application: the "African Monsoon Multidisciplinary Analyses" (AMMA) programme (Integrated Project funded by the EC FP6 programme)
- Institut de Recherche pour le Développement (IRD), Orléans, France. Application: Interactions fire-land cover/use changes in West Africa. (Dr. A.FOURNIER).
- UNEP-GRID Geneva: Department of Early Warning (P. Peduzzi).
- Directorates General of the European Commission. Application: Rural development in Africa; Management of protected areas; Sustainable use of forests resources.
  - o Development: DEV/B4 (P. Mikos)
  - o Europe Aid – Co-operation office: AIDCO/C6 (P. Roggeri) and AIDCO/F4 (M. Bousquet)
  - o External Relations: RELEX/04 (T. Bertouille, F. Saracco).

### **3. Algorithmic methodology**

The algorithmic methodology is fully described in the documents attached as pdf (Grégoire et la., 2003; Tansey et al., 2002, 2004). The input data are VEGETATION-S1 data. The methodological development is completed for the African continent. Other algorithm exist but they are more complex and not tested at a continental scale (Brivio et al., 2002). Similar products are available but not on a systematic basis (GLOBSCAR, derived from ATSR data, for the year 2000) or based on series of algorithms not fully documented and/or validated (GLOBCARBON derived from combination of ATSR and VGT)).

### **4. Ancillary data**

No

### **5. Examples**

Example of products for the African continent are enclosed to this document (ppt file)

### **6. Validation evidence**

Validation and intercomparisons with other sensors have already been achieved through different publications (Silva, 2003, 2004; Boschetti 2004).

### **7. Estimated cost from 'pre-operational' to 'operational'**

The prototype software and descriptive documents are already made available to VITO. This prototype software is written in IDL and ArcView language.



VITO estimates that the coding of the GBA2000 algorithms for Africa starting from the prototype software would take **2 man-months** of time. Several previous software development efforts can be reused to generate the Burnt Area Product. The scope could be limited to Africa, which implicates that only some algorithms (UTL etc.) have to be developed. Also starting from the S1 product saves a lot of time.

IPR of the GLOBCARBON products (including the adapted version of the GBA2000 algorithms as they are used in GLOBCARBON) is currently handled and owned by ESA (O. Arino as technical officer, L. Govaert as contractual officer). The original GBA2000 IPR is owned by the JRC.

## **8. References**

- Boschetti, L., Eva, H., Brivio, P.A. and Gallego, J., “The validation protocol of GBA2000 global burned area maps”, *IGARSS IEEE International Geoscience and Remote Sensing, session Land Degradation and Fires*, Anchorage, 20-24 September 2004, volume III: 2107-2110
- Boschetti, L., Eva, H.D., Brivio, P.A. and Grégoire, J-M., “Lessons to be learned from the comparison of three satellite-derived biomass burning products”, *Geophysical Research Letters*, 31 : 21, L21501 10.1029/2004GL021229, 2004
- Brivio P.A., Maggi M., Binaghi E., Gallo I., and Grégoire J-M., “Exploiting spatial and temporal information for extracting burned areas from time series of SPOT-VGT data”, in *Analysis of Multi-temporal Remote Sensing Images*, ( L. Bruzzone and P. Smith, Ed.), World Scientific Publishing, Singapore, 132-139, 2002
- Grégoire, J-M., Tansey, K. and Silva, J.M.N., “The GBA2000 initiative: Developing a global burned area database from SPOT-VEGETATION imagery”, *International Journal of Remote Sensing*, **24**, 6, 2003, 1369-1376
- Silva J., M. N., Pereira, J. M. C. and Grégoire, J-M., “Burned Area Mapping in Africa: Comparison of Coarse (VEGETATION) and Fine (ETM+) Spatial Resolution Maps”, 2<sup>nd</sup> Int. Vegetation Users Conference, Antwerpen (B), 24-26 March 2004.
- Silva, J. M. N., Pereira, J. M. C., Cabral, A. I., Sá, A. C. L., Vasconcelos, M. J. P., Mota, B. and Grégoire, J.-M. , “An estimate of the area burned in southern Africa during the 2000 dry season using SPOT-VEGETATION satellite data”, *Journal of Geophysical Research*, 108(D13), 8498, 2003.
- Tansey K., “Implementation of regional burnt area algorithms for the GBA2000 initiative”, *Publications of the European Communities*, EUR 20532, December 2002, pp 159
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- Tansey, K., Grégoire, J-M., Stroppiana, D., Sousa, A., Silva, J.M.N., Pereira, J.M.C., Boschetti, L., Maggi, M., Brivio, P.A., Fraser, R., Flasse, S., Ershov, D., Binaghi, E., Graetz, D. and Peduzzi “Vegetation burning in the year 2000: Global burned area estimates from SPOT VEGETATION data”, *Journal of Geophysical Research – Atmospheres*, vol. 109, D14S03, 2004.



## 9. Technical product sheet

<b><u>Product name</u></b>  <i>Burnt area</i>
<b><u>Algorithmic Methodology</u></b>
<b><u>Geometric Resolution</u></b>  <i>Mandatory for end users: 25 x 25 km for final product. But original VGT data resolution could be preferred for specific applications</i>
<b><u>Product Accuracy</u></b>
<b><u>Frequency Delivery</u></b>  <i>Every ten days</i>
<b><u>Ancillary data</u></b>  <i>No</i>
<b><u>Delivery time</u></b>  <i>1 month after data acquisition</i>
<b><u>Archive</u></b>  <i>Yes, the GBA2000 product archive. Available for download at: <a href="http://www-gvm.jrc.it/fire/gba2000/index.html">http://www-gvm.jrc.it/fire/gba2000/index.html</a></i>