Global Observation of Forest Cover: Report of the 2nd Meeting of the Scientific and Technical Board

ESA/ESRIN

Frascati, Italy

12 - 13 June 2001

Townshend, J.R.

GOFC-GOLD Report No. 12

Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) is a coordinated international effort to ensure a continuous program of space-based and in situ forest and other land cover observations to better understand global change, to support international assessments and environmental treaties and to contribute to natural resources management.

GOFC-GOLD encourages countries to increase their ability to measure and track forest and land cover dynamics by promoting and supporting participation on implementation teams and in regional networks. Through these forums, data users and providers share information to improve understanding of user requirements and product quality.

GOFC-GOLD is a Panel of the Global Terrestrial Observing System (GTOS), sponsored by FAO, UNESCO, WMO, ICSU and UNEP. The GOFC-GOLD Secretariat is hosted by Canada and supported by the Canadian Space Agency and Natural Resources Canada. Other contributing agencies include NASA, ESA, START and JRC. Further information can be obtained at
http://www.fao.org/gtos/gofc-gold

Global Observations of Forest Cover

Report of the 2nd Science and Technology Board Meeting

Compiled by John Townshend (Chair STB)

ESA/ESRIN,

Frascati

Italy

12th-13th June 2001

Report of the 2nd Scientific and Technical Board of Global Observations of Forest Cover

ESA/ESRIN

Frascati, Italy

12th. – 13th. June 2001

1. Opening of Meeting

   The meeting was opened at 9.00 am on the 12th. June by the chair of the STB, John Townshend. Stephen Briggs (ESA) welcomed the Board to ESA/ESRIN. Attendees introduced themselves. A list of attendees can be found in **Appendix 1**.

2. Acceptance of Agenda

   The agenda was accepted. The annotated agenda can be found in **Appendix 2**.

3. Chairman's Introduction

   The chairman presented a report on the status of GOFC, which can be found in **Appendix 3**.

   The Chair and/or Executive Director is requested to ask for direction/guidance from GTOS on how best to interact with sponsor organizations (e.g., to ensure a coordinated approach with other GTOS elements for funding requests). The Executive Committee will determine to whom these requests should be directed and what issues should be raised.
   ACTION: JT/RB

   The Executive Committee, with input from members of the STB, will review and update existing GOFC documentation and ensure that the mission/vision and strategy of GOFC are more clearly described.
   ACTION: Executive Committee led by Chair and Ex Director.

4. 1st. Meeting of the STB

   4.1 Approval of Minutes of the 1st STB.

   These minutes can be found at http://www.gofc.org/gofc/docs/stb2000.pdf. The minutes were approved with minor amendments.

   4.2 Actions arising from the 1st STB of GOFC.

   Action items were discussed under the appropriate items during the meeting.

5. Report of the Executive Director

Ron Brown reported on his work of the Executive Director and the work of the GOFC Office in CCRS, Ottawa, Canada. He reported that he had succeeded Tim Perrott in this role. The latter will continue to provide routine support for GOFC.

Core GOFC documents (in particular Web pages) need to be translated into additional languages. The Project Office will identify these documents and circulate them to JRC (A. Belward) and others (inc. regional network representatives) for their assistance in translation.
ACTION: Project Office.

The Project Office and regional network representatives will work together to promote a common 'look and feel' for the various GOFC Web sites.
ACTION: To be initiated by Project office.

6. Relationships between GTOS and GOFC (Jeff Tschirley)

GOFC has become a Panel of GTOS during the last year. Jeff Tschirley (Executive Director, GTOS) stated that GOFC had an important role within GTOS. He urged it to work closely with related activities such as TCO and the Terrestrial Panel for Observations on Climate.

7. Proposed Revisions of Terms of reference of the STB

Ron Brown will introduced minor alterations in the Terms of Reference for the STB and these were accepted.

At future STB meetings, a limited number of guests (esp. from the policy community) will be invited to attend special sessions. The Chair will welcome recommendations regarding potential invitees.
ACTION: Project Office to raise this item in planning for STB-3

8. Membership of the STB

The membership of the STB was reviewed and proposals for possible additional members will be entertained. Suggestions were made to include more end-users and in particular to invite representatives of those concerned with policy making.

9. Report of the Forest Cover Implementation Team (Iwan Gunawan and David Skole)

David Skole and Iwan Gunawan will reported on the work of the Forest Cover Implementation Team. Their report can be found in **Appendix 4**.

The Land Cover Implementation Team will identify a convener for a workshop on the validation of land cover products, presumably to be held in conjunction with the GLC2000 validation workshop in early 2002.
ACTION: Iwan Gunawan/ David Skole

10. Report of the Fire Implementation Team (Chris Justice)

Chris Justice will reported on the work of the Fire Implementation Team. The report is included as **Appendix 5**.

Members of the STB are invited to nominate additional members for the Fire implementation team, in particular to provide regional representation from Siberia, Asia, Central/South America, and Australasia, and for a co-chair for this team.
ACTION: All members of the STB

11. Regional Network Reports (Regional Network representatives)

The work of the Regional Networks was reported upon. Meeting reports of the Regional Networks are available on the GOFC web page (www.gocf.org).

The Chair will send a letter to the regional network representatives to congratulate and thank the network members for the tremendous progress made in producing tangible results.
ACTION: See Implementation Day, Action Item 7

The Implementation teams and regional networks will provide quantitative estimates of the resources required for the various projects and activities, which they have proposed. The Executive Committee will help to develop a process for this exercise.
ACTION: GOFC Office to collect information. (JT has received at least one set of estimates, which will be forwarded to the GOFC Office.) See also Item 5 from Implementation Day, which outlines proposed process.

12. Future GOFC Activities: The Biophysical Implementation Team and TCO (Josef Cihlar and John Townshend)

A proposal was made that the Terrestrial Carbon Observation activity led by Josef Cihlar become an Implementation Team of GOFC. The STB was asked to approve the inclusion of the TCO as an Implementation Team of GOFC. After considerable discussion it became apparent that TCO wished to develop a similar relationship with several other organizations. Organizationally it was felt that this would create an overly complex organizational relationship with insufficient benefits to both oprganizations.

It was recommended that close links be maintained through cross-membership between both organizations and that Josef Cihlar should be invited to participate in the Executive Committee telecons of GOFC.

ACTION: JT

Fred Baret was reported as agreeing to chair the Biophysical Implementation Team. The STB encouraged the development of the Biophysical Implementation Team and recognized that it should develop close relationships with TCO.

DAY 2 (13th. June)

Identification of Crucial deficiencies in GOFC Observations

13. Reports from agencies

Reports were received from several agencies including the Canadian Space Agency, NASA and ESA outlining how their plans should contribute to the removal of deficiencies in the needs of GOFC.

14. Review of overall status of deficiencies.

A review on the status of progress and deficiencies in the observations, products and services required by GOFC by David Skole and Chris Justice. This is summarized in tabular form in **Appendix 6**.

Related activities in other organizations

15. Report of FRA 2000 and future Activities.

Recently the FAO reported on its FRA 2000. A review of the results of this work was presented by Peter Holmgren (FAO) with an outline of future plans.

16. The Millenium Ecosystem Assessment and GOFC (Tony Janetos)

Tony Janetos (WRI) reported on plans for the Millenium Ecosystem Assessment and stressed the importance of the role of GOFC in supporting the Assessment.

The Chair will provide a formal response to the memo send by Walt Reid concerning the Millennium Ecosystem Assessment program's remote sensing requirements.
ACTION: JT See also item 15 from Implementation Day.

17. Collaborative activities with CEOS

17.1 WGCV (Jeff Privette, and Chris Justice)

The CEOS Working Group on Calibration and Validation is cooperating with GOFC. Jeff Privette reported on a workshop help on LAI, Chris Justice also report ed on the forthcoming workshop on Fire Product Validation. A copy of the report by the WGCV chair is provided in **Appendix 7**.

17.2 WGISS (Peter Churchill)

Peter Churchill is the Chair of the CEOS WGISS. In the previous year intensive collaboration has occurred between WGISS and GOFC in the development of tools to assist GOFC in its work. Peter Churchill will reported on this activity outlining the prototyping activities that had been carried out with GOFC. Some concern was expressed about the level effort required of GOFC collaborators in this effort. Peter Churchill said that this issue would be taken into account. He confirmed that

a demonstration of the prototype would be given at the next CEOS Plenary in Kyotot and that the presentation would be performed jointly by WGISS and GOFC representatives as agreed with the chair of the STB.

New developments in GOFC

18. A Proposed architecture for GOFC data information and services (Chris Justice and David Skole)

    Based on the experience with WGISS (Item 17) David Skole and Chris Justice proposed a distributed architecture for GOFC data information and services drawing on the capabilities of government agencies and collaborators within Universities.

19. Future activities of GOFC (Introduced by John Townshend)

    19.1 Taking account of views expressed by members of the STB, the Chair outlined the future activities for GOFC on the basis primarily of the reports from the two implementation Teams. The appendices of their reports should be consulted for details.

    19.2 It was proposed and agreed that the scope of GOFC should include all land cover. At the first STB it was agreed that at an appropriate time GOFC should include all land cover. The former was based in part on the fact that given the official FAO definition of forest cover as including areas with >10% forest cover a large proportion of the world is forest cover. Extending the scope of GOFC to include all land cover represents a relatively modest geographic change in scope. Interactions of GOFC with respect to the MEA and the TCO are currently placing pressure on GOFC to take this step of expanding its scope now. For example an understanding of the role of forests in carbon sequestration needs to take account of changes in other land cover types. It wass therefore agreed that we extend the scope of GOFC to include all land cover types. GOFC would however continue to focus on the world's forests.

    If the scope of GOFC is changed then it was agreed that GOFC should consider changing its name in some way to reflect these changed. The most popular proposal was GOLD - Global Observations of Landcover Dynamics and a progressive transition to this name was agreed. Members of the STB concerned with forests stressed that the name should not be abbreviated to Land Dynamics because of the geophysical connotations of such an appellation.

    GOFC's mandate is now expanded to encompass all land cover, and it was agreed to change the name of the project to reflect this (although the name and acronym have yet to be finalized). The Executive Committee will submit a recommendation to the STB to be voted upon.
    ACTION: initially JT to define a an outline process as agreed at the 1st executive Committee Telecom.

The Chair will convene a separate ad-hoc working group representing forestry users to review the implications of expanding GOFC's scope.
ACTION: JT to prepare terms of reference; proposed membership will at least initially be all members of the STB who are forestry users

19.3 The proposal for a major international conference outlining the work of GOFC along with open sessions for presentations of potential contributions to GOFC from the broader stake-holder communities of GOFC was welcomed but it was stressed that considerable planning would be needed as well as substantial fund raising.

An International GOFC Conference has been proposed for 2002; STB members are asked for feedback on the merits of this idea. Assuming that it is held, the organizers will be asked to convene a special session for funding agencies.
ACTION: awaits decision about international conference.

19.4 The Chair will convene an ad-hoc working group of the STB to evaluate GOFC's organizational structure, and to assess the recommendations made by the implementation team leaders.
ACTION: JT and Project Office to provide details of which recommendations are being referred to. See also Actions from implementation day.

19.5 The Chair and/or Executive Director will provide a formal response to the forthcoming draft RFP for the Landsat Data Continuity Mission, with guidance from the implementation team leaders. (first two weeks in August)
ACTION: JT/RB

20. United Nations Forest Forum

FAO members outlined the role of the United nations Forest Forum stressing its extremely wide scope covering all aspects of forestry, including development issues and socio-economic dimensions.

21. Any Other Business.

On the following day an Implementation Meeting was held. The agenda for this meeting is given in **Appendix 8** along with the main actions arising.

22. The meeting was closed at 4.30 pm. The chairman thanked ESA for their generosity in hosting the meeting

Appendix 1: List of Participants

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Appendix 2 Annotated agenda of 2nd STB meeting

2nd. STB Meeting of GOFC (12th-13th June 2001)

Draft Agenda v 6 (annotated)

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Implementation Meeting of GOFC for the Executive Committee and the Regional Network Representatives (14th June 2001)

Draft Agenda v 2

ESRIN, Frascati, Italy

DAY 1 (12th. June)

9.00 am

1. Opening of Meeting

Welcome (John Townshend and Stephen Briggs)

Introductions

STB Activities

9.15 am

2. Acceptance of Agenda

3. Chairman's Introduction

The Chairman will give a synopsis of the year's activities for GOFC and will give an overview of the objectives of the 2nd STB

9.45 am

4. 1st. Meeting of the STB

Approval of Minutes of the 1st STB.

These minutes can be found at http://www.gofc.org/gofc/docs/stb2000.pdf

Actions arising from the 1st STB of GOFC.

Action items will be discussed which do not naturally arise during the remainder of the agenda. The action items from the 1st STB minutes are given below.

Item 21 Action items

21.1 Actions for the Executive Committee:

1. The role of the regional networks must be explicitly developed as part of the GOFC organization document.
2. Develop Terms of Reference for STB membership, and submit to GTOS.
3. Establish lines of communication with IGBP.

4. Formalize the GOFC relationship in the GTOS organizational structure based on the initial draft suggested by Jim Gosz.
5. Develop reporting requirements for the STB Members, the Implementation Teams, and the Regional Networks which will result in efficient STB meetings in the future.
6. Ask GTOS to comment on the GOFC Strategic Design.
7. Develop high level criteria for the inclusion of projects.

21.2 Action for the Chair and Vice Chair of the Executive Committee

Seek potential leaders for the Biophysical Processes Implementation Team.

21.3 Actions for the GOFC Project Office:

1. Develop and refine the draft Status Table in consultation with the Implementation Team leaders.
2. Minutes from Executive Committee meetings are to be circulated to all STB members.

10.05 am

5. Report of the Executive Director

Ron Brown will report on the work of the Executive Director and the work of the GOFC Office in CCRS, Ottawa, Canada.

10.20 am

6. Relationships between GTOS and GOFC (Jeff Tschirley)

GOFC has become a Panel of GTOS during the last year. Jeff Tschirley (Executive Director, GTOS) will comment on the role of GOFC in GTOS and its relationship with other GTOS activities.

10.30 am

7. Proposed Revisions of Terms of reference of the STB

Some proposals have been made for the modification of the Terms of Reference of the STB. Ron Brown will introduce these proposals.

10.30 am - 10.50 am Cofee Break

10.50 am

8. Membership of the STB

The membership of the STB will be reviewed and proposals for possible additional members will be entertained.

Report of Implementation Teams and Regional Networks

11.00 am

9. Report of the Forest Cover Implementation Team (Iwan Gunawan and David Skole)

Iwan Gunawan and David Skole will report on the work of the Forest Cover Implementation Tea and outline the 3 year plan of the Team. The STB is asked to comment on the work of this Team and in particular the STB is asked to comment on the extent to which the priorities and tasks identified by the IT also intersect with agency interests.

12.00 noon

10. Report of the Fire Implementation Team (Chris Justice)

Chris Justice will report on the work of the Fire Implementation Tea and outline the 3 year plan of the Team. The STB is asked to comment on the work of this Team and in particular the STB is asked to comment on the extent to which the priorities and tasks identified by the IT also intersect with agency interests.

1.00pm - 2.15pm Lunch

2.15pm

11. Regional Network Reports (Regional Network representatives)

The work of the Regional Networks will be reported upon. Members of the STB are encouraged to review the meeting reports of the Networks available on the GOFC web page (www.gocf.org)

3.45-4.00pm Coffee

4.00 pm

12. Future GOFC Activities: The Biophysical Implementation Team and TCO (Josef Cihlar and John Townshend)

A proposal has been made that the Terrestrial Carbon Observation activity led by Josef Cihlar become an Implementation Team of GOFC. The Executive Committee warmly welcomed this proposal. The TCO will be meeting in the week previous to the STB in Frascati and Josef Cihlar will report on this meeting and the work of the TCO.

The STB is asked to approve the inclusion of the TCO as an Implementation Team of GOFC.

Fred Baret has agreed to chair the Biophysical Implementation Team starting in this role in July. The STB is invited to review the scope of the Biophysical Implementation Team and to consider its relationship to TCO.

5.00pm

Insert agenda item 20 here.

5.30 pm Close meeting for day

Meeting Dinner in the Evening

DAY 2 (13th. June)

Meeting commences at 9.00 am

9.00am

Identification of Crucial deficiencies in GOFC Observations

13 Reports from agencies

Agencies were asked prior to the 1st STB Meeting to comment on specific requests for products and services essential for the success of GOFC. Agencies are asked to report on the status of meeting these requests. They are also asked to identify any further specific contributions in relation to the plans of GOFC. (Because of time limitations it will NOT be possible to have general reports from agencies at this meeting. The latter was carried out at the 1st STB and although regarded as very valuable it will not be feasible to repeat this at the 2nd. STB within the context of a two day meeting that was requested by members of the STB)

10.40 - 11.00 am Coffee

Item 13 continues after coffee if necessary.

11.00am

14. Review of overall status of deficiencies.

Based on responses in item 13 the STB will be asked to review the status of deficiencies in the observations products and services required by GOFC.

Related activities in other organizations

11.30 am

15. Report of FRA 2000 and future Activities.

Recently the FAO reported on its FRA 2000. A review of the results of this work will be presented by Peter Holmgren (FAO) along with an indication of future plans. The STB is asked to comment on the role of this activity in relation to GOFC activities.

12.15 pm

16. The Millenium Ecosystem Assessment and GOFC (Tony Janetos)

Tony Janetos (WRI) will report on plans for the Millenium Ecosystem Assessment and the role of GOFC in the Assessment.

1.00pm-2.15pm Lunch

2.15pm

17. Collaborative activities with CEOS

2.15pm

WGCV (Jeff Privette, and Chris Justice)

The CEOS Working Group on Calibration and Validation is cooperating with GOFC. Jeff Privette is reporting on a workshop help on lAI, Chris Justice will report on the forthcoming workshop on Fire Product Validation and will comment on potential collaborations for Land Cover product validation.

2.45pm

WGISS (Peter Churchill)

Peter Churchill is the Chair of the CEOS WGISS. In the last year intensive collaboration has occurred between WGISS and GOFC in the development of tools to assist GOFC in its work. Peter Churchill will report on this activity.

New developments in GOFC

3.15pm

18. A Proposed architecture for GOFC data information and services (Chris Justice and David Skole)

Based on the experience with WGISS (Item 17) David Skole and Chris Justice will present a proposed architecture for GOFC data information and services.

3.45pm-4.00pm Coffee

4.00pm

19. Future activities of GOFC (Introduced by John Townshend)

Taking account of views expressed by members of the STB, the Chair will outline the year's proposed activities for GOFC.

One proposal that will be put forward is for a major international conference outlining the work of GOFC along with open sessions for presentations of potential contributions to GOFC from the broader stake-holder communities of GOFC.

Members of the Board will be encouraged to indicate where they believe they can offer support for these activities and to comment on the overall scope of the program. One issue discussed at the 1st STB is the desirability of expanding the scope of GOFC to include all land cover.

Item 20 moved to 1st day.

20. United Nations Forest Forum

We hope to have a presentation on this new initiative from FAO.

Close of meeting

21. Any Other Business

22.Date and Location of next meeting of the STB.

4.30pm

23. Closure of Meeting

Note the meeting has been condensed from 3 days for the 1st STB to 2 days for this meeting. Hence it is anticipated that the second day will be a full one with closure by 4.30 pm.

Appendix 3

Chairman's Report to the 2nd. STB of GOFC.

The success of the past year for GOFC is indicated by the numerous activities reported in the meeting documents and elsewhere. I have chosen in this report not to try and summarize all these activities which will be done with much greater thoroughness during the meeting but to highlight what I regard as some key issues facing GOFC in the coming year.

23. Our status in relation to GTOS

> I am happy to report that we are now formally regarded as a Panel of the Global Terrestrial Observing System. This has the considerable advantage of providing formal links through to a number of key international organisations.

24. Scope

The second is the scope of the GOFC. At the first STB this issue was discussed taking account in particular of the fact that the formal UN definition of forests includes all landscapes with more than 10% crown closure and this includes the large majority of all vegetated areas. Hence changing the scope of GOFC to include all land cover would not represent a major change. I believe it is time now to establish GOFC as taking this additional step while maintaining its emphasis in many of its activities on forests and the needs of forestry user constituencies. If we decide to change its scope then there is the secondary issue of whether to change the name of the organization and/or its acronym.

25. Projects and Contributions

A third issue relates to what constitutes a GOFC Project and what is regarded as a contribution to GOFC. It is important that this distinction is clearly made and understood. Following discussions with members of the Executive Committee I propose that we might make the distinction as follows.

a) GOFC Projects

> A GOFC Project is an activity carried out directly under the auspices of an Implementation Team. In other words it forms part of the work plan of an Implementation Team. GOFC will play a significant role in the work, though there may well be partners from other organizations. A project can include tasks such as new product definition, international coordination of implementation, quality assessment of a product, validation of an existing or new product, design of an information system or a component of one, evaluation of the value of a product for a particular application or generation of an assessment, definition of protocols or standards for observations. This does not mean that GOFC attempts to take ownership of everything that it touches. For example if an IT carries out

or coordinates the validation of a product, the title and definition of the project should be limited to that activity and not to the product itself. Progress on all projects will be documented by the ITs and reported to the STB in its annual report.

Criteria for a GOFC Project should include a set of essential and a set of desired or optional characteristics for GOFC projects. Some essential characteristics might include i) projects should contribute directly to meeting GOFC goals ii) projects should share their data and products (taking account of any legal constraints) iii) projects should provide descriptive material in support of GOFC outreach (including via the GOFC Web Site) iv) regular reporting on Project progress to the IT's

Desired Criteria might include i) projects should involve both data producers and users ii) projects should be demand driven iii) projects should develop a Web Page describing the project and its relevance to GOFC linking to the GOFC home page.

b) Contributions to GOFC.

Many other activities may be regarded as "Contributions to GOFC" and agencies and organizations should be allowed to use this appellation without hindrance unless it is clear that the product or service is not in accord with the goals of GOFC. The GOFC logo should only be used with permission from the Executive Director for such "contributions", though this would normally be given, unless the product or service is clearly antithetical to the goals of GOFC. Such contributions should NOT be referred to as GOFC projects.

26. Increasing awareness of and support for GOFC

The fourth issue relates to broadening awareness of GOFC and increasing support for its activities both in terms of people power and institutional support. One proposal we will be considering is holding an international conference next year both to report on our plans and activities and to invite papers and posters on contributions to GOFC from our various constituencies.

27. Additional implementation teams

A further issue is to consider whether we should increase our implementation teams to include the work of the Terrestrial Carbon Observations activity chaired by Josef Cihlar. I believe its inclusion would greatly strengthen both activities. Additionally we need to consider its relationship with the Biophysical IT, which is due to start its work during the coming year.

28. International coordination mechanisms.

An issue affecting much of our work relates to the development of international coordination mechanisms to enable us to obtain national commitments to the collection of systematic in situ observations. We need the help of the UN organizations who directly or indirectly sponsor our work for guidance in achieving these goals. We have useful analogies from the atmospheric and oceanographic fields to help guide us in this endeavor.

29. Linkages with other organizations.

We have begun to work successfully over the last year with two of the CEOS working groups (WGISS and WGCV). During this meeting we should try and establish more formally our linkages with the Millenium Ecosystem Assessment. Additionally we need to be careful to navigate our progress in relation to many other international activities to ensure unnecessary duplication and to co-operate to the maximum extent possible to leverage our activities.

30. The role of the STB

Many members of the STB have been active during the last year in the work of GOFC. However I personally do not believe that we have been active enough in drawing on the experience and capabilities of members of the Board. I believe that we must seek more effective mechanisms to engage members of the Board in the work of GOFC.

31. Support for the work of GOFC

Many organisations support the work of GOFC. I would like in particular to acknowledge the very substantial support provided by the Canada Centre for Remote Sensing and NASA. Without their contributions we would not be holding this meeting and little progress could have been made in any of our activities.

John Townshend

Chair GOFC STB.

Appendix 4 Forest Cover Implementation Team Report.

Report of the Forest Cover Implementation Team
GOFC Science and Technical Board Meeting
Frascati, Italy, 12-13 June 2001

David L. Skole, Co-Chair
Michigan State University
Iwan Gunawan, Co-Chair
BPPT Indonesia

This document is published separately as GOFC/GOLD Report No. 15

Appendix 5: Report of the Fire Implementation Team

Fire Implementation Team Report

Chris Justice
GOFC-Fire Implementation Team Leader
University of Maryland

1. Fire IT Members

• Olivier Arino, ESA/ESRIN, Italy
• Chris Elvidge, NOAA/NGDC, USA
• Johann Goldammer, GFMC, Germany
• Jean-Marie Gregoire, JRC, Italy
• Chris Justice (Chairman), UMd, USA
• Mastura Mahmud, UKM, Malaysia
• Elaine Prins, NOAA/NESDIS/ASPT, USA
• Brian Stocks, CFS/GLFC/IRM, Canada

2. Example Information Needs for Fire and Natural Resource Management

• Geographic data layers (forest and land use maps, digital terrain data, roads etc)
• Fire history
• Fire susceptibility
  – Fuel load
  – Fuel condition (mesoscale weather input)
• Active fire mapping
  – near real-time fire location, size, intensity
  – fire behavior models
• Burned area mapping/ estimation
• Fire fighting feature detection e.g. cut lines, water resources
• Smoke venting and dispersion
• End of season fire mapping – post fire assessment

3. Information needs for Global Change Research

32. 3.1 Satellite Data

• Primary Fire Information (stable record over decades)
  – Location
  – Timing of fires (as an input to emissions)
    – *Burned area*
    – *Fire intensity / energy released*
    - *Return frequency*

* Related Products (associated w. annual emission estimates)

– Vegetation type and parameters (e.g. % tree cover, biomass)
– Vegetation moisture content
– Aerosol optical thickness / Aerosol characteristics
» Distribution of traces gases e.g. CO, Tropospheric Ozone

3.2 In-situ Data

- **Satellite Vicarious Calibration**
  – Satellite Product Validation Data - Active fires, Burned area, others

- **Data Associated with Emissions Estimation**
  – Sampled Emission Factors –representative conditions
  – Sampled Fuel Loads –model validation
  – Sampled AOT – model validation
  – Ground Level Wind Speed –assimilated data

- **Model Output Associated with Emissions Estimation**
  – Modeled annual primary production > fuel load
  – Modeled trace-gas and particulate emissions

4. Fire Data System Requirements

4.1 Data Quality (operational and science QA) needed for operational products

– Identify deviations from stated algorithm performance
– Identify impact of instrument degradation on product
– Provide users with information on data quality

4.2 Product Validation (using higher resolution imagery or ground data)

– Stated accuracy of the product over range of environmental conditions
– Validation data needs to be made available to users

4.3 Availability and Access (ease of access)

– Easily accessible data including data from long term archives
– Metadata on what is available and how to get it
– Automated internet access preferable – some demand for hard media

4.4 Cost (affordable to the user)

– Price by compiled data set (i.e. time series) affordable at the individual project level
– When requesting an annual time series users cannot afford charges for individual orbits

4.5 Timeliness of Delivery (in time to be useful)
– 15 minutes for fire response /fighting
– Availability 14 days after acquisition would satisfy most GC researchers needs
– FTP pull within 24 hrs of availability, 7 days after ordering for media

5. Examples of Current and Planned Sensing Systems

• Fire Susceptibility (mod resolution moisture/vegetation index)

• Active Fire Detection
- – AVHRR, GOES, DMSP (operational systems)
- – TRMM, MODIS (AM), ATSR

• Burned Area Estimation
- – Coarse/moderate Resolution
  - • AVHRR, SeaWiFS, ATSR, VEGETATION
- – High Resolution
  - • Landsat 7, SPOT
  - • ASTER – high resolution optical and thermal
  - • ERS/JERS (not current), Radarsat
- – Hyperspectral data - EO-1
- – Hyper Spatial Resolution – Ikonos

• Examples of Planned Systems (next 4 yrs)
- – MODIS (PM) – active fire (standard) / burned area (experimental)
- – MERIS – burned area
- – NPP VIIRS – active fire and burned area / intensity
- – VCL – vegetation structure
- – Others - Fuego, InSAR, MSG, GLI, BIRD

6. Summary of GOFC-Fire goals

6.1 Geostationary global fire network
- – providing operational standard fire products (active fire) in a timely fashion

6.2 Polar orbiters (with fire monitoring capability)
- – providing operational moderate resolution long-term global fire products to meet user requirements and distributed ground stations providing enhanced regional products (fuel moisture content/active fire/burned area)
- – operational high resolution acquisition allowing post-fire assessments

6.3 Emissions product suites
- developed and implemented providing input data and annual estimates

6.4 Product accuracy

– operational network of fire validation sites and protocols established providing accuracy assessment for operational products and test bed for new or enhanced products leading to standard products of known accuracy

6.5 Enhanced user products and data access

- operational multi-source fire / GIS products - Web based data access

6.6 User awareness

– increased understanding of the utility of satellite fire products for global change research, resource management and policy (UN, Regional, National, Local)

7. Examples of Needed GOFC-Fire Enabling Projects

7.1 The expansion of the World Fire Web active fire monitoring network to provide global coverage with <24-hour turnaround time – multiple satellite and ground station sources.

7.2 The production of 1 km resolution regional and global area burned products, with moderate resolution sensors, such as ATSR , VGT and MODIS

7.3 Develop a network of fire validation sites with standard data collection protocols and reporting

7.4 Community (producers and users) demonstration projects: enhanced multisource satellite data and GIS for selected regions

– satellite and modeled emissions

– end to end fire monitoring system (fire risk, fire monitoring, fire recovery)

7.5 Regional case studies of operational use of satellite fire data for fire management, emissions and smoke monitoring

8. Example GOFC Contributory Projects

• AVHRR World Fire Web (EU/JRC)
• GOES Fire Monitoring (NOAA)
• ATSR Fire Atlas (ESA)
• DMSP Global Fire System (NOAA)
• TRMM Active Fire Montoring (NASA)
• SEA Asia Fire and Haze Monitoring (NOAA)
• Fire M3 (CCRS/CFS)
• GLOBSCAR / Italscar (ESA)
• MODIS Global Fire /Rapid Response System (NASA)
• Global Fire Monitoring Center (Germany)
• Miombo Fire Validation Network (NASA)
• AVHRR US Fire Emissions (NASA)

9. GOFC Fire Progress To Date

• GOFC Fire Coordination Workshop – JRC Ispra (1999)
  – Fire Book – papers and discussion groups
• S Africa Miombo GOFC Fire Workshop – Matopos (1999)
  – Validation SAFARI Zambia (2000)
• Southeast Asia GOFC Fire Workshop – Tokyo (2001)
• GOFC presentation / discussion – EARSEL / Paris (2001)
• *GOFC Fire Validation Workshop – Lisbon (July 01)*
• *GOFC Fire presentation / discussion – Sivam, Brazil (Aug 01)*
• *GOFC Fire Emissions Workshop - Washington (02)*

10. STB Support Needed for GOFC-Fire Enabling Activities (2001/2)

10.1 Support :

– Transitioning research based fire monitoring to the operational domain (e.g. WFW, Fire M3, ANDES, MODIS, Italscar)
– Securing operational fire monitoring systems (e.g. DMSP)
– Establishing new required operational capabilities e.g. VIIRS/EDR
- Continued development of the Global Geostationary Fire Network and Distribution System.

10.2 Identify resources to establish an Global Fire Validation Network

– agencies providing systematic data acquisition and distribution for validation sites and activities (w. CVWG LPV)
– support for Fire Subgroup activities to coordinate the network (Workshop 2002)

10.3 Identify resources for rapid prototyping of a Multi-source Fire Data and Information Delivery Systems

– coordinated effort building on WFW, with data served from multiple sensors combined with GIS data (regional implementation e.g. SEA/ S.Africa) tied to user outreach e.g. combining DMSP/AVHRR/TRMM/MODIS/ATSR

10.4 Establish an open dialogue on role of GOFC in the context of UN Global Fire Monitoring needs – UNWGWF, FAO, UNEP

10.5 Identify resources to support implementation - meetings, workshops, reports, outreach

– GOFC Fire Office
– Workshops planned - 2002
  • (GOFC-Fire Annual Meeting on Fire Emissions Estimation - (Summer)
  • Regional Workshop Southern Africa Fire Data User Workshop (Fall 2002)
  • Regional Workshop SEARIN GOFC Fire Data User Workshop (TBD)
  • GOFC Fire Validation Group/LPV meeting (TBD)

11. STB Guidance Needed

- GOFC/DMSG relationship
- Suggestions for additional IT Members (Siberia/ Asia / C - S.America / Australasia) – co-chair
- Emissions Products
- Johannesburg 2002 (Rio + 10) – GOFC Fire Demo ?
- Fire Implementation Team needs for GOFC Projects – GC, NRM, Assessments

Appendix 6 GOFC Status Table 2001

												Data services						
Product type Product	Confirmed users?[1]	User needs[2]	Sat. data prods[3]	In-situ cal/val data[3]	Algorithm develop-ment[4]	Algorithm validation[5]	Regional demo[6]	Global demo[6]	Pre-production testing[6]	Operation[7]		Local or distributed data assembly[4]	Production machinery[4]	Product warehouse[4]	Product discovery[4]	Product validation[4]	Product distribution[4]	User feedback mech-anism[4]
Fire Products																		
Active fires	Y	P	A	P	P	R	U	P	U	U		R	R	R	R	R	R	P
Burn scars Mod.Resn(250m-1km) High Resn (<30m)	Y	P	U $DC	U	R	R	U	P	P	N		P	P	P	R	P	P	N
Emissions	Y	P	U	U	P	R	P	N	N	N		N	N	N	N	N	N	N
Coarse res'n Land cover																		
Non-forest classes	Y	D	UP	U	R	GR	U	P	U	N		R	R	R	R	R	R	P
Leaf type	Y	D	UP	U	R	GR	U	U	U	N		R	R	R	R	R	R	P
Leaf longevity	Y	D	UP	U	R	GR	U	U	U	N		R	R	R	R	R	R	P
Canopy cover	Y	D	UP	U	R	GR	U	U	U	N		R	R	R	R	R	R	P
Canopy height	Y	D	U	U	R	GR	P	P	P	N		R	R	R	R	R	R	P
Flooded forest	Y	P	U	U	R	R	U	C	U	N		R	R	R	R	R	R	P
Coarse res'n Land Cover Change	Y	D	AP	U	R	R	C	P	U	U		P	P	P	P	P	P	P

[1] Y = Yes, N = No
[2] N = None; P = Preliminary; D= Detailed
[3] A= Available; U= Under Development; P=Preliminary; $ = Cost limitations; D = Distribution limitations; C =continuity issues

[4] N = None; P = Preliminary; R = being refined for GOFC; O = Operational
[5] N = None; L = Local; R = Regional; G = Global
[6] N = None; P = Planned; U = Underway; C = Completed

[7] N = None; P = Planned; U = Underway

Fine res'n Land cover																		
Non-forest classes	Y	D	CP	U	R	R	U	P	P	N		N	N	N	N	N	N	N
Leaf type	Y	D	CP	U	R	R	U	P	P	N		N	N	N	N	N	N	N
Leaf longevity	Y	D	CP	U	R	R	U	P	P	N		N	N	N	N	N	N	N
Canopy cover	Y	D	CP	U	R	R	U	P	P	N		N	N	N	N	N	N	N
Canopy height	Y	D	CU	U	R	R	P	P	P	N		N	N	N	N	N	N	N
Flooded forest	Y	P	CA	U	R	R	U	P	P	N		N	N	N	N	N	N	N
Land cover change																		
Forest to nonforest	Y	D	DC	D	R	R	C	N	U	N		R	R	R	R	R	R	R
Nonforest to forest	Y	D	DC	D	R	R	C	N	U	N		R	R	R	R	R	R	R
No change	Y	D	DC	D	R	R	C	N	U	N		R	R	R	R	R	R	R
Biophysical Products																		
LAI	Y	D	DC	$	R	R	P	P	N	N		P?	P?	P?	P?	P?	P?	P?
PAR	Y	D	DC	$	R	R	P	P	N	N		P?	P?	P?	P?	P?	P?	P?
FPAR	Y	D	DC	$	R	R	P	P	N	N		P?	P?	P?	P?	P?	P?	P?
Biomass	Y	D	DC	$D	P	N	?	?	N	N		N	N	N	N	N	N	N
NPP	Y	D	DC	$	P	R	P	P	N	N		P?	P?	P?	P?	P?	P?	P?

Note: This table has been partially updated from the original plans. Changes have been made for Fire and Land Cover Products only.

Appendix 7 Report of the CEOS WGCV in relation GOFC activities.

The CEOS WGCV Land Product Validation Subgroup

Jeff Privette and Jeff Morisette

The Land Product Validation (LPV) Subgroup of the CEOS Working Group on Calibration and Validation (WGCV) was formally approved at the 17th WGCV Meeting, October 25-27 in Gaithersburg, MD, USA. The LPV Subgroup will address the issues concerning validation of higher-level satellite products (e.g., leaf area index, fires/burn scar detection, land cover). Prior to WGCV approval, approximately 30 validation scientists met in Ispra, Italy (May 2000) to discuss outstanding concerns in high-level product validation and potential objectives of a new subgroup. The initial charter for the group largely follows recommendations from that meeting.

The advent of the LPV Subgroup coincides with the greatly expanding stream of operational products from various operational or planned satellite systems. Many of these products involve significantly more computational processing (i.e., are of higher level) than did products from heritage systems. Moreover, the products are becoming more economical, widely available, and designed for rapid assimilation into process models, such as biogeochemistry and climate models. Because important scientific and policy decisions will inevitably follow from their usage, it follows that rigorous and comprehensive validation programs should accompany these products. Following the WGCV definition, LPV is concerned with quantitative estimation of product uncertainty via independent means.

Goals

The two general goals of LPV are 1) to increase the quality and economy of global product validation via developing and promoting international standards/protocols for field sampling, scaling, error budgeting, data exchange and product evaluation, and 2) to advocate mission-long validation programs for current and future earth observing satellites. Acknowledging that validation of operational land products is in its infancy, LPV strives to set a strong precedent in validation rigor such that operational products can be used in an appropriate manner and product-generating algorithms can be improved with time. Key to these goals will be ongoing communication and coordination with the sensor calibration and process modeling (e.g., climate) communities, as well as field data collection experts. In association with the other WGCV subgroups, LPV will also focus on development of a global land validation site network for which multi-sensor product archives are developed and augmented and available to the international community.

Subgroup Structure and Planned Activities

LPV will revolve around a series of topical meetings organized in association with

community experts. Initially, LPV is focused on moderate-resolution (~1 km) products from polar orbiters, however future efforts will address fine scale products, as well as products from geosynchronous and other orbiters. First-round LPV activities will compliment the research agenda of the Global Observation of Forest Cover (GOFC) program, namely biophysical products, fire/burn scar detection, and land cover mapping. Specifically, two joint meetings of GOFC and the LPV are planned for mid-2001: an LAI validation meeting in Frascati, Italy slated for June, and a fire validation meeting in Lisbon, Portugal planned for July. The LAI meeting will include an update and early results from an LAI Product Intercomparison activity planned in May 2000. In an effort to highlight challenges to wide international collaboration in validation, scientists agreed to exchange field data collected in 2000 and to evaluate both operational and research-level LAI algorithms. Data sets from more than 20 field sites have been made available for this ongoing
activity.

The Fire meeting will follow-up on recommendations made at the GOFC Fire workshop held at Ispra, developing protocols for active fire and burned area validation and reporting and a network representative long-term monitoring sites for fire product validation. Themes under consideration for validation coordination meetings in 2002 and beyond, include fine resolution GOFC land cover and biomass products, albedo and bidirectional reflectance, snow cover and available water, land surface temperature, and geostationary satellite land products.

Jeffrey L. Privette will serve as LPV Chair, and Jeffrey Morisette as Deputy Chair (both at NASA's Goddard Space Flight Center, Code 923), for 3- to 5-year terms.

The LPV activities are posted on the web at:
http://modarch.gsfc.nasa.gov/MODIS/LAND/VAL/CEOS_WGCV/

Presentations and a Report from the May 2000 meeting are available from:
http://wgcv.ceos.org/docs/other_meetings/lpv/summary.html

POC: Jeffrey L. Privette, Code 923, jeff.privette@gsfc.nasa.gov,
Tel. 301-614-6630

Appendix 8 Agenda and actions arising from the post-STB meeting on Implementation.

DAY 3 (14th. June)

Implementation Meeting Draft Agenda Version 1

Members of the Executive Committee and Regional Network Representatives will meet on the 14th. June to consider their plans for the coming year taking account of the meeting of the STB. Members of the STB who wish to attend this meeting will be very welcome to participate in the meeting

1. Land Cover Implementation Team

2. Fire Implementation Team

3. Other Implementation Team

4. Regional Networks

5. GOFC International Meeting

6. Assessment of Resource needs for meetings, workshops etc

Action Items arising from GOFC Implementation Meeting– June 14, 2001

1) GOFC faces a number of challenges if it is going to move forward effectively:

1.1) Need to provide greater specificity about our objectives (e.g., to increase accuracy of land cover classification by x percent, or extend mapping to areas not currently covered by existing programs); i.e., articulate what are the objectives and why are they important;

ACTION: Ad Hoc Committee – see Item 2

1.2) Need to clearly spell out resources (funding) required for specific GOFC activities (e.g., workshops); -

ACTION: None; duplicated elsewhere.

1.3) Need to develop a funding strategy for GOFC

ACTION: To be initiated by Executive Director and then brought to the Excom.

1.4) Need to broaden the number of people who are playing key roles within GOFC; it may be appropriate to reexamine existing organizational structure (e.g., divide land cover mapping/monitoring into separate fine and coarse resolution streams);-

ACTION for IT's and Regional Leads

1.5) need to ensure that there is traceability of GOFC products/activities to user requirements (especially if we want to increase linkages with other programs, such as FRA, MEA, TCO, etc...). – (

ACTION: IT's to develop an on-going process to articulate user needs and requirements.

1.6) GOFC needs to make better use of the talent within the STB. The Executive Committee should consider different meeting formats, use of subgroups, perhaps assigning each member specific tasks to report on. It was noted that any new strategic partners will likely want representation on the Board.

ACTION: Excom

2.1) The Strategic Ad-hoc Working Group of the STB (Action Item 6 from STB meeting) will be expanded in terms of its membership and mandate. Its revised scope should include:

- Revisiting and updating key documents (e.g., strategic design document), with a view to identifying more clearly what GOFC does that is unique (revised mission plan);
- Identifying priority targets and strategies, which the implementation teams and regional networks can then translate into specific action plans (inc. performance measures);
- Evaluate the organizational structure of GOFC

ACTION: JT/RB to set up Working Group
ACTION: GOFC Office to revisit notes for proposed membership.

2.2) To support the work of the Strategic Working Group new information/promotional materials should be created for various audiences, i.e., user/producer/funding communities; it should be made clear to potential partners, for example, how their existing programs/activities can become contributing activities under GOFC.

ACTION: GOFC Office.

2.3) The release of new documents could be part of a 'relaunch' to publicize GOFC's new name and expanded mandate (perhaps in conjunction with the international conference proposed for 2002). Although it was suggested that a professional planning consultant be hired to assist in preparing recommendations and documentation, due to shortage of funds it is recommended that this should be done by the GOFC Office– consultant. The working group outputs will be circulated to the full STB for review prior to public release.

ACTION: GOFC Office

3) START has received funding from NASA to support GOFC for the next three years (starting August 1, 2001)for developing country participation in GOFC..

While plans for the first year's funding have already been made, the Executive Committee will meet by telecon later this year to discuss funding priorities for the second and third years and provide recommendations to START, with a copy to NASA (the budget for year 2 needs to be submitted approx. end of May 2002). Amy Friese (START) will be invited to participate in this telecon. It was noted that the recommendations should address GOFC requirements as a whole and show other funding sources in addition to START. The GOFC Secretariat and START should provide a strategy for obtaining funds beyond NASA's contribution to allow broader participation in GOFC by developing countries. The needs of the biophysical processes implementation team should also be considered.

ACTION: START and GOFC office to prepare materials and then bring them to the attention of the Excom

4) The following procedure was recommended in order to identify funding requirements and secure needed resources on an annual basis:

- Implementation Team leaders and Regional Network Representatives will draw up lists of activities requiring funding, which will include a brief description (approx. one paragraph) and an estimate of the funds required ($) for each one (Actions needed summarized in STB-2 Action 8);
- these will be edited into a consistent format by the Project Office, and will then be sent to different agencies (beginning with START), trying to match activities to agency interests (the ExComm will provide guidance on which agencies may be most appropriate);
- the list of activities/requirements will also be circulated to STB members;
- when appropriate, the GOFC secretariariat and/or START can act as broker, so that multiple agencies can coordinate modest contributions of travel funds and/or expertise for activities such as training courses;
- the Executive Director will inform the IT's and Regional leads of the funding currently available and expected time lines for obtaining the requested funds.
- ITC/FLAME (and possibly some space agencies) may be interested in funding 'GOFC fellowships' through START

5) D. Skole offered to set up a TRFIC node for OSFAC, at least in terms of providing operational support (hardware contributions - server, CD writer, etc... - should be solicited from other sources).

ACTION: David Skole

6) FAO (P. Reichart) offered to provide data/demonstration materials (and instructors?) for training activities in Central Africa (from AFRICOVER project).

ACTION: Paul Reichert (GOFC Office to follow up to ensure action is complete)

7) J. Townshend and/or R. Brown will write to regional representatives to provide official recognition for their network initiatives and hopefully assist in securing local support from government and/or other agencies. S. Mastura will provide names & addresses of people who should receive letters in SE Asia (4 countries) and other

regional representatives will do the same if required and review drafts before final letters sent.

ACTION: GOFC Office to remind regional Reps of the need for this information and then collate it.

ACTION: JT/RB to compose letter.

8) C. Justice will contact P. Desanker regarding priority areas for Landsat 7 coverage in Miombo region and forward these to J. Townshend (recognizing that full regional coverage will eventually be required); the data will be needed on CD's.

ACTION: C. O. Justice

9) GTOS is requested to identify their regional activities and to try and coordinate these with GOFC network activities.

ACTION: GTOS

10) D. Skole will produce a calender of meetings for SE Asian GOFC network and ensure that a GTOS representative is invited; R. Lumbuenamo will do the same for OSFAC.

- invitations to regional meetings (to GTOS, WGISS, others) should come from the STB Chair or the Executive Director, and include a request for a presentation.

ACTION: David Skole and Raymond Lumbuenamo

11) J. Townshend will send letter to J. Cihlar (or J. Tschirley) with proposal that TCO be a collaborative project between GTOS and GOFC (note that there is no formal TCO organizational structure as yet)

ACTION: JT

J. Townshend will represent GOFC in TCO organization, however it is eventually configured (J. Cihlar represents TCO on GOFC STB);J. Cihlar will be invited to participate in GOFC ExComm telecons.

12) J. Townshend will forward comments provided by STB members regarding the biophysical processes component of the design document to Frederic Baret, who will be asked to update this plan based on current developments.

ACTION: JT

13) D. Skole will ask C. Schmullius if there is a person from her proposed SIBERIA project team (using C- and L-band SAR to estimate biomass) who might be suitable as a co-chair for the biophysical processes implementation team;

ACTION: David Skole

14) STB members will consult with colleagues at their respective agencies to identify other candidates (hopefully providing a good geographical and gender balance to the Executive Committee).

ACTION: STB to be informed

15) S. Mastura will invite WGISS chair to send representative to attend SE Asia regional meetings.

ACTION S. Mastura

16) J. Townshend will also write to WGISS chair, encouraging their participation (copy to office)

ACTION: JT

17) S. Mastura will write to J. Townshend following SEARIN meeting in August with feedback regarding WGISS collaboration (inc. current/potential value of tools to regional users).

ACTION: S. Mastura

18) A small ad-hoc working group will be set up to work with the Millenium Ecosystem Assessment; members should include J. Townshend, T. Janetos, S. Mastura, P. Desanker.

ACTION: JT to convene

IT chairs will provide a nominee from each of their teams.

ACTION IT Leaders to nominate members

19) The Executive Committee will discuss objectives, timing, logistics, etc… for an international GOFC conference after receiving feedback from the STB on merits of such a conference (would not likely be held until late 2002 or 2003).

ACTION: Excomm.
