Biogeochemical Flux Model
Agreement

BETWEEN

Centro Euro-Mediterraneo per i Cambiamenti Climatici SCARL established in Via Augusto Imperatore, 16 - 73100, Lecce, Italy, duly represented for the purpose of the signature of this agreement by its President and legal representative, Dr. Antonio Navarra (hereinafter referred to as "CMCC"),

AND

Alma Mater Studiorum Università di Bologna, Department of Physics, established in Viale Berti Pichat 6/2 -40127, Bologna, Italy, duly represented for the purpose of the signature of this agreement by its Director and legal representative, Prof. Paolo Capiluppi (hereinafter referred to as "UNIBO DIPFIS")

AND

Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS established in Borgo Grotta Gigante 42/C - 34010, Sgonico (TS), Italy, duly represented for the purpose of the signature of this agreement by its President and legal representative, Prof. Iginio Marson (hereinafter referred to as "INOGS")

hereinafter, jointly or individually, referred to as "Parties" or "Party

WHEREAS

- The Parties have conducted research activities, either jointly or individually, for the development of a biogeochemical model system suitable for research and operational work in the marine field called Biogeochemical Flux Model (hereinafter referred to as "BFM System");
- The Parties have a common interest in continuing the research activities for the development and implementation of the BFM System, according to a Work Plan agreed among them;
- The Parties intend to make available the BFM System and its further development to the scientific community for research and teaching use under the appropriate license terms, so that they may obtain the best dissemination of the BFM System assuring effective protection of intellectual property rights;

- The Parties wish therefore to set out the terms, the conditions and the organisational rules under which the Work Plan will be performed and the dissemination, the use and the distribution of BFM System to third parties may be allowed.

NOW THEREFORE, THE PARTIES HAVE AGREED AS FOLLOWS

Article 1. Purpose, definitions and principles

1.1 Purpose of the Consortium Agreement

The purpose of this Consortium Agreement ("Agreement") is to set up appropriate arrangements for the successful and sustainable development of the BFM as a modular, portable, parallel state-of-the-art biogeochemical model system suitable for both research and operational work in the marine field.

In order to achieve this goal the Parties have agreed in this Agreement on:

i)   the arrangements for managing and coordinating the work of the BFM System Team as defined in article 1.3 and for setting its priorities;

ii)   the resources they will commit each year to the BFM System Team which will support, maintain and develop the code of the BFM System;

iii)   the arrangements for the Intellectual Property rights over the BFM System to make the code freely available under an appropriate version of the GNU Public License with the aim of attracting a critical mass of scientists to use the BFM System and contribute developments to be incorporated into it.

The Parties expect to obtain real mutual benefits from collaboration including: common decision making on priorities, strategic and technical choices; sharing of work on technical model support; making the latest developments readily available to research and operational oceanography groups; and improving the collaboration worldwide on ocean biogeochemical modelling research, ocean biogeochemical forecasting in coastal and open ocean and in coupled Earth System modelling.

1.2 Collaboration Principles of the Agreement

For the purpose of enabling the Parties to work together, it is agreed that each of the Parties

1. will devote sufficient resources and expertise to enable the work outlined in Article 2 below to proceed in a competent and timely manner in line with recognised best practices for such work;

2. recognise and understand each other's objectives, needs, capabilities responsibilities and constraints, regarding the activities outlined in Article 2 and other related activities;

1.3 Definitions

The terms defined in this Agreement have the respective meanings ascribed to them therein, and the following terms have the following meanings:

Access Rights: licenses and user rights to Background or Foreground.

Background: the pre-existing knowledge owned by any of the Parties, necessary for the purpose of this Agreement, and the related Intellectual Property Rights identified in Annex 3.

BFM: Biogeochemical Flux Model

GPL: the GNU Public License agreement. The relevant version of the license is defined in Article 5.2.

Consortium: all the Parties.

Foreground: any knowledge created as a direct result from work undertaken by one or several Parties in the development of the BFM System under this Agreement and the related Intellectual Property Rights.

Intellectual Property Rights means any and all rights on trade marks, designs, national or foreign patents, copyright (including copyright in software), confidential information, trade or business names, database rights, know how, technology and other intellectual property rights (and any applications for the foregoing).

Person-Month (PM) means the equivalent of one month of staff time (as defined by the rules used by each Party).

BFM System Team Coordinator: the role described in article 4.3 occupied at present by the person identified in Annex 1.

BFM Scientific Leader: the role described in article 4.3 and occupied at present by the person identified in Annex 1.

BFM System means the software package including source codes, documentation, installation and verification procedures and subsequent releases. The components included in the current system are described in Annex 2.

BFM core package: the software containing the computer code translation of the BFM biogeochemical parameterizations described as non-dimensional processes, the time integration routines and the scripts for automatic code generation.

BFM Coupled System: the package containing all the components for a biogeochemical model, for its coupling with hydrodynamic models, the script systems used for configuration control and to create and run executables, specific pre-processing tools and post-processing tools to analyse model outputs, a package of standard configurations and installation tests.

BFM System Team: the team described in article 4.2 (whose current members are identified in Annex 1.)

Object Code: the software in machine-readable compiled and/or executable form including, but not limited to, byte code form and in form of machine-readable libraries used for linking procedures and functions to other software.

Source Code: the software in human-readable form normally used to make modifications to it, including but not limited to comments and procedural code such as job control language and scripts to control compilation and installation.

Steering Committee: the committee described in article 4.1

User: a third party authorized to use the BFM System or a part of it under the appropriate GPL terms.

Work Plan: the plan of the foreseen activities for the BFM System Team describing the contributions to be made by staff from each of the Parties. The current plan is attached as Annex 4.

These expressions may be used in both singular and plural form.

Article 2. Work Plan

The Work Plan describing the work which each of the Parties will contribute to the BFM System Team and is attached in Annex 4.

2.1 Annual reporting

Report of work done every year by the BFM System Team is delivered by the BFM System Team Coordinator to the Steering Committee.

2.2 Duration and updates

The Work Plan is organized on a three year basis and updated annually if necessary. Updates to the Work Plan are presented by the BFM System Team Coordinator to the Steering Committee.

Article 3. Financial arrangements

3.1 Each Party shall contribute at least 12 PM of effort on a three year basis to the Work Plan of the BFM System Team and pay all the travel/subsistence expenses for meetings for its own personnel involved in the Agreement.

3.2 Each Party shall bear its own costs relating to the tasks which it agrees to undertake in the Work Plan of the BFM System Team.

Article 4. Governance structure

4.1 Steering Committee

4.1.1 Role

The Steering Committee is the consortium's decision-making and arbitration body. It shall take decisions on:

i. the strategic directions of the Work Plan;
ii. the appointment of the BFM System Team Coordinator and the BFM Scientific Leader;
iii. the updating of the Work Plan attached as Annex 4 ;
iv. the definition of a new Work Plan;
v. the contributions of each Party to the Work Plan;
vi. nomination of the chair person;
vii. approval on an annual basis of the members of the BFM System Team as proposed by the BFM System Team Coordinator and BFM Scientific Leader;
viii. review/amendment of any schedule or Annex to this Agreement;
ix. proposal to the Parties of any amendment of the main text of this Agreement
x. identification of a breach by a Party of its obligation under this Agreement and related Annexes and remedies related thereto, including termination of that Party ;
xi. disputes between the Parties;
xii. entry of a new Party to this Agreement and approval on the settlement on the modalities and conditions of the accession of such a new Party.

4.1.2 Composition

The Steering Committee is composed of one representative from each Party. These representatives are identified in Annex 1. The BFM Scientific Leader and the BFM System Team Coordinator shall also attend the meetings.

Subject to the foregoing provisions of this Section, each Party may replace its respective Steering Committee representative at any time, upon thirty (30) days written notice to the other Parties.

Any Party may appoint a substitute for the meeting of the Steering Committee by presenting a proxy statement to the chairperson.

4.1.3 Chairperson of the Steering Committee

The chairperson of the Steering Committee shall be appointed by the Steering Committee for a period of two years. The Parties agree that the chairperson for the first period of two years is the representative of CMCC. . The chair will rotate to another Party every two years. The chairperson sets the agenda for the meetings of the Steering Committee, chairs meetings of the Steering Committee and undertakes the appropriate actions to support the BFM System Team Coordinator to implement the decisions of the Steering Committee.

4.1.4 Meetings

The Steering Committee normally meets once a year. Extraordinary meetings may be requested by any Party upon written notice to the chairperson or by the BFM System Team Coordinator.

The chairperson shall give each of the Parties, also via email, at least thirty (30) calendar days written advance notice of such meetings or fifteen (15) calendar days notice in case of extraordinary meetings.

Should a Party suggest adding a discussion point/resolution to the proposed agenda, it shall give written notice thereof to all other Parties at least seven (7) calendar days prior to the meeting date.

The chairperson shall draft the minutes of each meeting to formalise in writing all decisions taken and shall dispatch them to all Parties within fifteen (l5) calendar days of the concerned meeting.

The minutes shall be considered as accepted by the Parties if, within fifteen (15) calendar days from receipt thereof, no Party present or represented at the said meeting has objected in writing to the chairperson.

4.1.5 Voting rules

Each Party representative of the Steering Committee will be eligible to vote on matters concerning the Consortium. Each Party shall have one vote. All decisions will be taken normally by mutual consensus. If all efforts to reach consensus fail, the decisions shall be taken by a majority of two-thirds (2/3) of votes.

In case all Parties could not be present or represented at the meeting, decisions can be taken also by exchange of mails between all Parties or via teleconference.

4.2 The BFM System Team

4.2.1 Role

The BFM System Team roles are:

i. to implement and carry out the Work Plan;

ii. to incorporate new developments into the BFM System (scientific or technical);

iii. to organise the code to improve its readability or structure if needed;

iv. to optimise the BFM System performance on the computers available to the consortium;

v. to maintain the paper and on-line documentations;

vi. to make a configuration control of the available versions of BFM System;

vii. to test and release new versions;

viii. to set up and maintain the user forum;

ix. to provide practical support for User meetings (see Article 4.3);

x. to contribute to the public outreach of the BFM

xi. to seek opportunities for funding.

4.2.2 Composition

The BFM System Team is composed of leading biogeochemical and ocean modelling scientists appointed by the Parties among their personnel and researchers having complementary and necessary expertise for the development of the BFM System.

The list of personnel assigned by each Party and the time spent by each of them will be agreed on an annual basis and specified in Annex 1.

According to the agenda, any expert may be invited to attend the meetings of the BFM System Team.

4.2.3 Co-ordination

The BFM System Team will be co-ordinated by the BFM System Team Coordinator. The BFM System Team Coordinator is identified in Annex 1.

4.2.4 Meetings

The meetings are convened by the BFM System Team Coordinator on an annual basis at such locations as the Parties agree, at least three months before the Steering Committee

meeting. Extraordinary meetings may be requested at any time if necessary, by the BFM System Team Coordinator or the BFM Scientific Leader.

The BFM System Team Coordinator shall give each of the member of the BFM System Team at least thirty (30) calendar days written advance notice of such meetings or fifteen (15) calendar days notice in case of extraordinary meetings, together with a written agenda.

Should a member of the BFM System Team suggest adding a discussion point/resolution to the proposed agenda, it shall give written notice thereof to all others members at least seven (7) calendar days prior to the meeting date.

The BFM System Team Coordinator or a designated person shall draft the minutes of each meeting and shall dispatch them to all members within fifteen (15) calendar days of the concerned meeting.

The minutes shall be considered as accepted by the members if, within fifteen (15) calendar days from receipt thereof, no member present or represented at the said meeting has objected in writing to the BFM System Team Coordinator.

The final part of each meeting will involve only the Party representatives of the BFM System Team and will be devoted to examination of the Work Plan.

4.2.5 Working groups

The BFM System Team will propose and set up working groups as needed to further explore particular strategies and/or technical choices. These groups will be coordinated by a leader, will work on specific questions for a limited duration, and will report regularly at the next BFM System Team meeting.

4.2.6 BFM System Team Coordinator

The BFM System Team Coordinator is identified in Annex 1 and is nominated by the Steering Committee. The BFM System Team Coordinator will be responsible for:

  i. setting the agenda and chairing the meetings of the BFM System Team.

  ii. coordinating scientific and technical discussions and achieve consensus on the implementation of the Work Plan;

 iii. coordinating contributions proposed by the BFM System Team members and propose updates to the Work Plan;

 iv. maintaining regular contact between BFM System Team members and encouraging constructive team work;

  v. monitoring progress against the Work Plan and reporting deviations to the chairperson of the Steering Committee;

vi.   proposing updates to the Work Plan in consultation with the BFM Scientific Leader to the Steering Committee;

vii. organising the users' meeting.

4.2.7 BFM Scientific Leader

The BFM Scientific Leader is identified in Annex 1 and is nominated by the Steering Committee. The BFM Scientific Leader:

i.   supervises and reviews the scientific activities of the Work Plan within the BFM System Team;

ii.   proposes updates to the Work Plan in consultation with the BFM System Team Coordinator to the Steering Committee; ;

iii. contributes to the public outreach of the Consortium and seeks opportunities for funding.

iv.   proposes on an annual basis to the Steering Committee the members of the BFM System Team.

4.3 Users' meeting

These meetings will be held annually and convened upon proposal of the BFM System Team. At this end, the BFM System Team Coordinator shall provide proper notice at least 4 (four) month before the meeting, via the website of the BFM and if possible, by means of invitation notices to the Users. The Users' meetings are intended to provide a relaxed, informal, forum for presentation of recent progress, discussion of problems and constructive feedback from users, and facilitate the development of collaborations between the Users and the Parties.

Article 5. Intellectual Property Rights and Licences

5.1 Background

5.1.1 Each Party shall take appropriate measures to ensure that it can grant Access Rights and fulfil its obligations under this Agreement notwithstanding any rights of its staff, agents or subcontractors.

5.1.2 Each Party owns and shall retain exclusive title to all Intellectual Property Rights related to its own Background, including without limitation all the patented or unpatented information, data and other know-how owned or controlled by a Party prior to the signature or accession to this Agreement. No Party has any right under this Agreement to use any other Party's brand names or logos.

5.1.3 Background Excluded. The Parties have identified and listed in Annex 3 the Background they hold and that is not part of this Agreement.

5.1.4 Parties have identified in the Annex 2 the Components of the BFM System that are relevant for the implementation of the Agreement.

5.1.5 Parties agree that Access Rights to the Foreground and to the Background needed for the implementation of their own work under the Agreement shall be granted free of any charge. Access Rights are granted on a non –exclusive basis

5.2 Foreground

5.2.1 The Intellectual Property Rights to all Foreground shall be co-owned by the Parties identified as BFM System Team.

5.2.2 On demand of the BFM System Team Coordinator, the Party whose representative is the Chairperson of the Steering Committee shall be responsible for applying for, obtaining and maintaining the relevant patent protection and/or any other form of intellectual property protection. All the related cost shall be shared between the Parties .

5.2.3 The Parties shall grant to each other a world-wide, royalty free license to install, use, further develop, sub-license, copy and distribute the Foreground under an appropriate version of the GNU Public License.

5.2.4 The Parties distributing code relating to the BFM System shall only distribute recent versions of the Reference code or sets of modifications from (i.e. changes to) recent Reference versions of the code.

5.3 Foreground created and contributed by another Party

5.3.1 The Parties will ensure that any software submitted to the BFM System Team and considered relevant to the BFM System development is subjected to an agreed quality control process and work standards, before integration with the BFM System.

5.3.2 The Parties shall ensure that any Party submitting a relevant software to the BFM System Team:

i) has assigned the Foreground to the BFM System Team, under the agreement that the original authorship is maintained or

ii) has granted the BFM System Team a world-wide, irrevocable license, free of charge, to install, use, further develop, sub-license, copy, distribute and store the Foreground under the appropriate version of the GNU Public License.

5.4 Licenses

Version 3 of the GNU Public License (GPLv3) will be used to grant Access Rights and for the

dissemination and distribution of BFM System code. A copy of the license is available at http://www.gnu.org/licenses/gpl.txt.

The documentation will be released under the Creative Commons license.

All the prior existing codes with the GPLv2 have been upgraded to the GPLv3 and shall be accompanied with the following statement:

Copyright (C) YEAR BFM System Team

This program is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

5.4 Access rights to the public

The Consortium will make available to all Parties the Reference code under an appropriate version of the GPL. Any Party distributing the BFM System must distribute the Reference code, including the Source Code as part of the distribution package.

5.5 Acknowledgement of the BFM System

Publications and communications which make use of the BFM System should provide acknowledgement of "use of the BFM System (BFM web site address)".

Article 6. Party employees

6.1. Employees or other personnel delegated by a Party may perform work within the scope of this Agreement in the offices and laboratories of another Party only with the permission of both Parties. Employees or other personnel of a Party that will be authorized to work in other Parties' premises, must comply with the disciplinary and safety regulations in force in such Party offices and laboratories.

6.2 Each Party shall be solely responsible for the payment of salaries to their employees involved in the Project, together with all the necessary social and tax obligations of the employer and shall provide for the insurance coverage.

6.3 Each Party agrees to hold harmless the other Parties from any claims or suits raised by its own employees involved in the Agreement.

Article 7. Confidentiality

7.1 During the term of this Agreement and for a period of five (5) years thereafter, the Parties shall treat as confidential any information which is designated as confidential by the disclosing Party by an appropriate stamp, legend or any other notice in writing, or when disclosed orally, has been identified as confidential at the time of disclosure and has been promptly - thirty (30) days at the latest - confirmed and designated in writing as confidential information by the disclosing Party.

7.2 Accordingly, each Party undertakes that:

i) the Party receiving confidential information shall not use any such information for any purpose other than in accordance with the terms of this Agreement, and

ii) the receiving Party shall not disclose any such confidential information to any third party except with the disclosing Party's prior written consent, and

iii) such information shall neither be copied, nor otherwise reproduced nor duplicated in whole or in part where such copying, reproduction or duplication have not been specifically authorised in writing by the disclosing Party.

7.3 The confidentiality obligation stipulated above shall not apply to information for which the receiving Party can prove that it :

i) was in public domain or publicly available prior to its communication by the disclosing Party or fell within the public domain after such communication but through no fault of its own;

ii) was already in its possession at the time of signature of this Agreement or at the date of disclosure;

iii) is received from a third party without any breach of any secrecy obligation;

iv) is subsequently developed by the receiving Party independently of the any confidential information received from the disclosing Party;

v) had to be communicated to comply with applicable laws or regulations or with a court of administrative order provided that insofar as reasonably possible the receiving Party shall have informed the disclosing Party of such need and shall have complied with the disclosing Party's reasonable instructions designed to protect the confidentiality of such information.

7.4 The receiving Parties shall be responsible for the fulfilment of the above obligations on the part of their employees or any other person working for them who may have access to

confidential information, and shall assure that their employees remain so obliged, as far as legally possible, during and after the end of the Agreement and/or after the termination of employment.

8. Publication

8.1 Any proposed publication or communication by one of the Parties, in connection with all or part of the Agreement is required to be submitted to the other Parties.

8.2 To this end, a brief description and the subject of the proposed publication or communication shall be submitted to the other Parties. The Parties shall have a period of one (1) calendar month from the date of receipt of the proposed publication or communication to object to the publication/communication. Beyond this period, this consent shall be deemed to have been given. This objection may consist in a request that the publication or communication be postponed if, in the opinion of the objecting Party, real and serious reasons require this, especially if the information contained in the proposed publication or communication should be the subject matter of industrial property protection.

However, none of the Parties may withhold their consent to publication or communication upon the expiry of a period of three (3) calendar months.

8.3 Nothing contained in the above paragraphs shall prevent the submission of a thesis to examiners in accordance with the normal internal regulations and practice of the Parties that are Academic and research Institutions , subject where appropriate to such examiners being bound by confidentiality provisions;

8.4 All publications and communications which make use of the BFM System should provide acknowledgement of "use of the BFM System (BFM *web site address*)".

Article 9. Changes to the Consortium

9.1 Entry of a new Party

By joining the Consortium, a new Party agrees to contribute resources to the Work Plan as defined in Articles 2 and 3.

The entry into the Consortium of a new Party shall become effective after an unanimous vote of the Steering Committee, upon the signature of the Accession Form attached to this Agreement (Annex 5) by such Party and the chairperson of the Steering Committee.

No change to the Agreement shall be requested by a new Party before its entry.

New Parties may take part in discussions of the Work Plan up to six months before their commitment of resources to the BFM System Team begins.

A new Party shall be granted Access rights to the Background and Foreground on the same conditions as the pre-existing Parties (Articles 5.1 and 5.2).

The new Party will have co-ownership of the code developed from the other Parties from the date of signature of the Accession Form.

9.2 Grounds for Excluding a Party

Without prejudice to any other rights or remedies, the Steering Committee may after an unanimous vote terminate the participation of a Party to the Consortium, if that Party:

i) is in material breach of any of the terms of this Agreement and, where the breach is capable of remedy, the Party fails to remedy such breach within 30 days' service of a written notice of the chairperson of the Steering Committee specifying the breach and requiring it to be remedied; or

ii) in the opinion of a majority of the Steering Committee commits any act of gross or persistent misconduct and/or neglects or omits to perform any of its duties or obligations under this Agreement; or

iii) ceases to operate its business or undertaking.

The concerned Party may not vote on decisions regarding its termination. The termination is communication to the concerned Party by means of a written notice.

9.3. Withdrawal of a Party

Any Party may request to terminate its participation in this Agreement, by giving 3 (three) months prior written notice of termination to the other Parties, by means of registered mail with acknowledgement of receipt, indicating the reasons for termination.

9.4 Withdrawal, exclusion of a Party

The withdrawing or excluded Party agrees to treat as confidential all confidential information, as defined in article 7, for a period of five (5) years from the date of its withdrawal or its exclusion, and agrees not to apply for any patent or other proprietary right over any information, subject to its own information, it may have had knowledge of in connection with its participation in the Agreement.

Any Party withdrawing or excluded from the Agreement automatically relinquishes the Access Rights granted under Article 5.2 and the co-ownership of any future Foreground developed by the other Parties under this Agreement after the date of withdrawal or exclusion.

The withdrawing or excluded Party may have Access Rights to future code developed from BFM under a suitable version of the GPL.

Any withdrawing or excluded Party shall continue to grant Access Rights to the other Parties pursuant to this Agreement as if it had remained a Party. The Party withdrawing or excluded from the Consortium shall honour its financial commitments up to the effective date of its withdrawal or exclusion.

Article 10. Term and termination

This Agreement will become effective when signed by all the Parties, and shall remain in force for a period of six (6) years unless terminated by the Parties by mutual consent.

This Agreement may be renewed or extended by a written request of a Party to be notified to the other Parties at least three (3) months before the expiration date and agreed by all the Parties.

The provisions related to Intellectual Property Rights and Licences, Confidentiality, Publication, Liability, Applicable law and Settlement of Disputes shall survive the expiration or termination for whatever reason of this Agreement.

Termination shall not affect any right or obligations of a Party leaving the Consortium incurred prior the date of termination.

Article 11 . Liability

11.1 In respect of any information or materials (incl. Foreground and Background) by one Party to another supplied under this Agreement, no warranty or representation of any kind is made, given or implied as to the sufficiency, accuracy or fitness for purpose nor as to the absence of any infringement of any proprietary rights of third parties.

11.2 No Party shall be responsible to another for indirect or consequential loss or damages such as but not limited to loss of profit, loss of revenue, or loss of contracts.

11.3 Subject always to such other undertakings and warranties as are provided for in this Agreement, each Party shall be solely liable for any loss, damage or injury to third parties resulting solely from the performance of its Work Plan.

Article 12. General Provisions.

12.1 Entire agreement

This Agreement, its premises and whereas, and the Annexes shall constitute the entire agreement among the Parties in respect of the Agreement, and supersede all previous negotiations, commitments and documents concerning the Agreement.

12.2 Transfer or assignment

No Party shall assign or otherwise transfer partially or totally any of its rights or obligations under this Agreement.

Article 12.3 Language

This Agreement is drawn up in the English, which language shall govern all documents, notices and meetings, for its performance and application and/or extension or in any other way relative thereto.

12.4. Relationship of Parties

The relationship of the Parties is exclusively that of independent contractors and nothing contained in this Agreement shall be construed as creating any partnership, joint venture or agency relationship between the Parties.

Each Party recognises that it has no authority to and agrees that it will not, make or give any contract, representation, warranty, undertaking or other commitment on behalf of any other Party.

12.5. Amendment and attachments

Amendments or changes to the text of this Agreement, not explicitly listed in Article 4.1.1, require a separate written agreement among the Parties.

This Agreement consists of this core text and the following Annexes which form an integral and inseparable part thereof:

Annex 1 List of the representatives of the Parties in the Steering Committee and in the BFM System Team. Identification of the BFM System Team Coordinator and of the BFM Scientific Leader; List of the contact persons;

Annex 2 Components of the BFM System

Annex 3 Background excluded

Annex 4 Work Plan

Annex 5 Accession Form

In case of conflicts between the Annexes and the core text of this Agreement, the latter shall prevail.

12.6 Severability

Should any provision of this Agreement prove to be invalid, or subsequently become invalid, whether in whole or in part, it shall not affect the validity of the remaining provisions of this Agreement. In such a case, the Parties shall negotiate a valid and practicable provision which most nearly fulfils the purpose of the invalid provision.

12.7. Notices and other communication

Any notice to be given under this Agreement shall be in writing to the addresses and recipients as listed in Annex 1.

Article 13. Applicable law and Settlement of disputes

This Agreement shall be construed according to and governed by the Italian Law.

All disputes arising from this Agreement which cannot be amicably resolved by the Steering Committee shall be finally settled through arbitration in Italy under the Rules of Arbitration of the International Chamber of Commerce (ICC). Arbitral proceedings shall be conducted in the English language.

The arbitration award, if providing for damages, shall include interest from the date of any breach or other violation of this Agreement.

The arbitration award shall be final and binding upon the Parties.

Article 14.. Signature of special contracts

Special contracts may be concluded among the Parties for any issue not covered by the provisions of this Agreement.

Article 15. Signatures

The Parties have caused this Agreement to be duly signed by the undersigned authorized representatives in 3 (three) counterparts .

Centro Euro-Mediterraneo per i Cambiamenti Climatici SCARL

(Full name of Partner)

DR. ANTONIO NAVARRA, President

_____

 (Full name of authorised signatory)

_____

 (Signature)

January 31, 2011

_____

 (Date)

Dipartimento di Fisica, Università di Bologna

(Full name of Partner)

PROF. PAOLO CAPILUPPI, Director

(Full name of authorised signatory)

IL DIRETTORE DEL DIPARTIMENTO
(Prof. Paolo Capiluppi)

(Signature)

31/03/2011

(Date)

Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
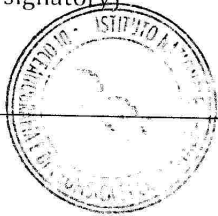
(Full name of Partner)

PROF. IGINIO MARSON, President

(Full name of authorised signatory)

IL PRESIDENTE
Prof. Iginio Marson

(Signature)

04 APR. 2011

(Date)

Annex 1. List of members and other contact persons

A1.1 Members of the Steering Committee

Chairperson of the Steering Committee
Dr Simona Masina,
Institute: CMCC
E-mail: simona.masina@cmcc.it
Address: Viale Aldo Moro 44, 40127 Bologna, Italy
Tel: +39 051 3782620 Fax: +39 051 3782654

Other members:
Prof. Nadia Pinardi
Institute: UNIBO DIPFIS
E-mail: nadia.pinardi@unibo.it
Address: Viale Aldo Moro 44, 40127 Bologna, Italy
Tel. +39 051 3782633 Fax +39 051 3782654

Dr. Cosimo Solidoro
Institute: OGS
E-mail: csolidoro@ogs.trieste.it
Address: Borgo Grotta Gigante 42/C, 34010, Sgonico (TS), Italy
Tel. +39 040 2140 315 Fax +39 040 2140 266

A1.2 BFM Scientific Leader and BFM System Team Coordinator:

BFM Scientific Leader
Dr. Marco Zavatarelli,
Institute: UNIBO DIPFIS
E-mail: marco.zavatarelli@unibo.it
Address: Viale Berti Pichat 6/2, 40127, Bologna, Italy
Tel. +39 051 2095060 Fax +39 051 249644

BFM System Team Coordinator
Dr. Marcello Vichi
Institute: CMCC
E-mail: marcello.vichi@cmcc.it
Address: Viale Aldo Moro 44, 40127 Bologna. Italy
Tel: +39 051 3782631 Fax: +39 051 3782654

A1.3 Members of the BFM System Team

Representative

Name	Institution	PM (over 3 years)
Marco Zavatarelli	UNIBO DIPFIS	4
Marcello Vichi	CMCC	4
Paolo Lazzari	OGS	6

Other members

Name (role)	Institution	PM (over 3 years)
Emanuela Clementi	UNIBO DIPFIS	3
Luca Giacomelli	UNIBO DIPFIS	1
Gelsomina Mattia	UNIBO DIPFIS	3
Nadia Pinardi	UNIBO DIPFIS	1
Simona Masina	CMCC	1
William McKiver	CMCC	3
Tomas Lovato	CMCC	3
Italo Epicoco	CMCC	2
Silvia Mocavero	CMCC	2
Alessandro Crise	OGS	1
Cosimo Solidoro	OGS	1
Giorgio Bolzon	OGS	3
Gianpiero Cossarini	OGS	3
Simone Libralato	OGS	3

Annex 2. Components of the BFM System

Components of the BFM System

Name	Description
A2.1 BFM Core (STANDALONE)	Zero-dimensional version with biological reactions
A2.2 BFM-POM (BFM_POM1D)	One-dimensional coupling with the Princeton Ocean Model
A2.3 BFM-POM (BFM_POM3D)	Three-dimensional coupling with the Princeton Ocean Model
A2.4 BFM-NEMO (BFM_NEMO)	Three-dimensional coupling with the NEMO ocean model
A2.5 BFM-OPATM (BFM_OPATM8_1)	Three-dimensional coupling with the ocean transport model based on OPA 8.1

A2.1 BFM core (STANDALONE)

- Source code of the BFM written in FORTRAN90 including the scripts to generate the model structural files from a specialized meta-language.

- Source codes of the subroutines for time-marching and numerical integration of the STANDALONE configuration

- Technical report describing the structure of the core code and a simple STANDALONE example.

A2.2 Components of the one-dimensional coupled system BFM-POM (BFM_POM1D)

- FORTRAN77 one-dimensional Princeton Ocean Model (POM-1D), with main code modified with built in coupling with BFM (through subroutine calls).

- POM-BFM coupling interface formed by FORTRAN90 routines and modules (pom_ini_bfm.f90, ModuleService.f90 and fixed-format files pom_ia_bfm.f, pom_to_bfm.f, pom_bfm.f) .

- UNIX/LINUX Makefile and script to compile and execute the model.

- Standard configuration (vertical discretization, initial conditions, monthly varying forcing functions) of the coupled system for three locations in the Adriatic Sea under perpetual year forcing functions. These are provided for illustrative purposes enabling one to verify that the code flow is correct.

- Post processing tools built on MATLAB to plot and analyse model output.

- Scientific papers of model coupling applications.

A2.3 components of the three-dimensional coupled system BFM-POM (BFM_POM3D)

- FORTRAN77 three-dimensional Princeton Ocean General Circulation Model (POM-3D), with main code modified with built in (subroutines calls) coupling with BFM and upgraded with:

    o Surface flux interactive computation from atmospheric data and model predicted SST

    o Open boundary conditions computation for off-line nesting with larger domain three dimensional general circulation model.

    o MUSCL advection scheme for tracers

- POM-BFM coupling interface formed by FORTRAN90 routines and modules (pom_ini_bfm.f90, ModuleService.f90 and fixed-format files pom_ia_bfm.f, pom_to_bfm.f, pom_bfm.f) .

- UNIX/LINUX Makefile and script to compile end execute the model.

- Standard configuration (model grid, initial conditions, 6hrs varying atmospheric data for surface forcing functions computation) of the coupled system for the Adriatic Sea. These are provided for illustrative purposes enabling one to verify that the code flow is correct. This code is optimized for NEC SX architectures.

- Post processing tools built on MATLAB to plot and analyse model output.

- Documentation (user manual) for model coupling.

A2.4 components of the coupled system BFM-NEMO (BFM_NEMO)

- Source code of the coupling routines between the BFM and NEMO version 2_3 written in FORTRAN90. The code includes new features that are not in the original coupling of NEMO with other biogeochemical models:

    o Routine to read and apply open boundary conditions

    o Routine to initialise the model with analytically prescribed vertical profiles of all the components or from external files.

- Namelists and script to run the model in one-dimensional configuration using the facitilities activated by the configuration macros key_cfg1d.

- Documentation of the technical coupling, modifications to the original NEMO code and description of the subroutines used.

A2.5 components of the coupled system BFM-OPATM (BFM_OPATM8_1)

- Source code of the coupling routines between the BFM and OPATM version 8.1 written in FORTRAN90;

- Standard configuration (model grid, initial conditions, 1 month varying OGCM forcings). These are provided for illustrative purposes enabling one to verify that the code flow is correct. This code is optimized for parallel architectures;

- Documentation of the technical coupling, modifications to the original OPATM-BFM code and description of the subroutines used.

Annex 3. Background excluded

CMCC
The global ocean version of the BFM model coupled with OPA8.2 (hereafter referred as PELAGOS), represented the original version of the BFM code. This code and the version that is part of the CMCC Earth System Model is not part of this agreement.

OGS
The Mediterranean Sea version of the BFM model coupled with OPA8.1 (hereafter referred as OPATM-BFM) is part of the OGS Operational System Model and is not part of this agreement.

DIPFIS
The 1D version of the POM coupled with a preliminary BFM code is not part of this agreement.

Annex 4. Work Plan

Action topics are divided in maintenance and consolidation of the BFM System components by

   a) Code maintenance and distribution

   b) Code efficiency and portability

   c) Maintenance, upgrade and addition of examples and configurations

and scientific improvements and/or implementation of new features.

The actions are organized in tables, one for each specific objective, containing a priority code, a description of the activity, and a priority code defined as:

   0   Urgent: 0-6 months
   1   Short-term: 0-12 months
   2   Intermediate: 12-24 months
   3   Long-term: 24-36 months

In the framework of the work plan, the following glossary is used for software maintenance:
   •   *Revision*: Equivalent to version.
   •   *Version*: Any change in form of the software that is stored in a revision control system. A revision is technically the state at a point in time of the entire tree in the repository.
   •   *Release*: a version of the software that has met a defined quality level and can be distributed publicly. Software releases are defined as:
        o   *Alpha*: initial public release of a partially stable revision that has been tested on a selected set of architectures. It does not require thorough testing with all the examples.
        o   *Beta*: public release of a revision that is stable on the designated architectures and tested with the planned examples.

Work plan for 2011-2013

The initial work plan is focused on the set up of the BFM System and the tools for its distribution and maintenance.

Web Tools and Revision Control System (RCS) Duration: 3; Responsible:	
Priority	**Description**
0	Choice and implementation of the RCS (currently SVN), location of the server and access protocols
1	Reorganization of the current CMCC BFM web site (download section, user registration, etc.)

Core Package (STANDALONE) Duration: 12; Responsible: M. Vichi	
Priority	**Description**
0	Analysis of the standard BFM STANDALONE structure and parameterizations. Definition of tasks, workload sharing and time schedule. Preparation of the alpha release.
1	Definition and set-up of standard examples (pelagic shallow system, laboratory culture, mesocosm, etc.) for the alpha release
1	Documentation of the alpha release
1	Test of the alpha release in the STANDALONE examples
1	Publication of the alpha release of BFM STANDALONE
2	Revision of feedbacks. Publication of the beta release of BFM STANDALONE.

BFM_POM1D
Duration: 24; Responsible: M. Zavatarelli

Priority	Description
1	Preparation of the technical documentation and standard examples
1	Release of BFM_POM1D (alpha release)
2	Optimization of the current FORTRAN code for F90 compilation
2	Addition of more examples (including paleoceanography)
3	Switch to POM F90
3	Upgrade to the latest BFM release

BFM_POM3D
Duration: 24; Responsible: M. Zavatarelli

Priority	Description
1	Preparation of the technical documentation and standard examples
1	Release of BFM_POM3D (alpha release)
2	Optimization of the current FORTRAN code for F90 compilation
2	Addition of more examples
3	Switch to POM F90 and parallelization
3	Upgrade to the latest BFM release

BFM_NEMO
Duration: 24; Responsible: M. Vichi

Priority	Description
1	Testing of the global ocean climatological implementation (alpha version)
1	Preparation of the technical documentation and standard examples
1	Release of BFM-NEMO (alpha version)
2	Implementation of academic case studies (gyre, upwelling, etc.)
2/3	Addition of the Mediterranean configuration
3	Revision of feedbacks. Beta Release of BFM_NEMO
3	Upgrade of BFM_NEMO updated with the most recent NEMO version

BFM_OPATM
Duration: 24; Responsible:P. Lazzari

Priority	Description
1	Testing of the OPATM-BFM implementation (alpha version)
1	Preparation of the technical documentation and standard examples
1	Release of the OPATM-BFM (alpha version)
2	Revision of feedbacks. Beta Release of OPATM-BFM
3	Upgrade of OPATM-BFM with the most recent BFM standalone version

New Features to be developed

Priority	Description	
2	Coupling with GOTM	
2	Benthic System	
2	Sea ice biology	
3	Coupling with SHYFEM	
3	Integration with food web ecological models	

Annex 5

ACCESSION FORM

of a new Party to BFM Consortium Agreement

[NAME OF THE NEW PARTY]

hereby consents to become a Party to the BFM Agreement identified above and accepts all the rights and obligations of a Party starting *[date]*.

[The chairperson]

hereby certifies that the Steering Committee has unanimously accepted in the meeting held on *[date]* the accession of *[the name of the new Party]* to the Consortium starting *[date]*.

This Accession document has been done in 2 originals to be duly signed by the undersigned authorised representatives.

[Date and Place]

 [INSERT NAME OF THE NEW PARTY]
Signature(s)

Name(s)

Title(s)

[Date and Place]

[INSERT NAME OF THE Chairperson]
Signature(s)
Name(s)
Title(s)