

# LIEGE

## International Liège Colloquium on Ocean Hydrodynamics



Prof. Jacques C.J. NIHOUL, *Modelenvironment*  
University of Liège, B5 Sart Tilman, B-4000 Liège (Belgium)  
Tel. : +32-4-366 33 50 — Fax : +32-4-366 23 55 — e-mail : j.nihoul@ulg.ac.be

- **33<sup>rd</sup> INTERNATIONAL LIEGE COLLOQUIUM ON OCEAN HYDRODYNAMICS**  
**Liège, Belgium, May 7-11 2001**

*The use of data assimilation in coupled hydrodynamic, ecological and bio-geo-chemical models of the ocean*

### Sponsorship and Patronage

The members of the Organizing Committees wish to express their gratitude to the

- Commission of the European Union
- Fonds National de la Recherche Scientifique (FNRS, Belgium)
- Intergovernmental Oceanographic Commission (IOC)
- International Association for the Physical Sciences of the Ocean (IAPSO)
- Ministère de l'Enseignement Supérieur et de la Recherche Scientifique de la Communauté Française de Belgique
- Ministère du Budget, Finances, Emploi et Formation du Gouvernement Wallon
- National Science Foundation (NSF, USA)
- Office of Naval Research International Field Office (ONR, USA)
- Scientific Council on Oceanic Research (SCOR, ICSU)
- Services Fédéraux des Affaires Scientifiques Techniques et Culturelles (SSTC, Belgium)
- University of Liège

### Monday May 7<sup>th</sup> a.m.

- 09h00-10h00: Registration – Coffe

- 10h00-10h05: **Introduction**  
ROBINSON A. R.

**SESSION : OVERVIEW OF INTERDISCIPLINARY RESEARCH  
PROGRESS AND ISSUES : DATA, MODELS AND DATA  
ASSIMILATION CRITERIA**

**Chairperson:** P. LERMUSIAUX  
Harvard University, Cambridge, USA

-10h05-10h55:  
**Invited presentation** *A view Toward Future Interdisciplinary Ocean Observations for Use in Coupled Data Assimilation Models*  
DICKY T. D.  
*Ocean Physics Laboratory, University of California, Santa Barbara*

- 10h55-11h45:  
**Invited presentation** *Data Assimilation for Modeling and Predicting Coupled Physical-Biological Interactions in the Sea*  
ROBINSON A. R. AND LERMUSIAUX P. F.  
Harvard University, Cambridge, USA

- 11h45-12h35:  
**Invited presentation** *Issues in defining misfit between biogeochemical observations and models*  
EVANS G. T.  
Canadian Department of Fisheries and Oceans, St. John's, Newfoundland

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### Monday May 7<sup>th</sup> p.m

- **Chairperson:** DICKY T.  
Ocean Physics Laboratory, University of California, Santa Barbara, USA
  
- 14h30-15h15:  
**Invited presentation** *Data Assimilation and Coupled Biological/Physical Models : What types of Data do we Need?*  
ABBOTT M. R., SPITZ Y. H., FENNEL K., LETELIER R. M.,  
RICHMAN J. G. AND NAHORNIAK J.  
College of Oceanic and Atmospheric Sciences, Oregon State University,  
Corvallis, USA
- 15h15-15h45:  
*Inverse modelling of marine biogeochemical systems : how well does it work?*  
VEZINA A. F.  
Bedford Institute of Oceanography, Dartmouth, Canada
- 15h45-16h15:  
*Estimation of the forecast error statistic in a quasi-geostrophic model of the Northeast Atlantic using ensemble method*  
ETIENNE H. <sup>1</sup>, DOMBROWSKY E. <sup>1</sup>, De MEY P. <sup>2</sup>  
1 CLS, Ramonville St-Agne, France  
2 LEGOS, Toulouse, France
- 16h15-16h45:  
*An adjoint data assimilation approach to estimate parameters for a three-dimensional coupled physical and biological model*  
ZHAO L., WEI H.  
*Institute of Physical Oceanography, Ocean University of Qingdao, P.R. China*
- 16h45-17h00 :  
Coffee, Poster Session
- 17h00:  
**Official opening and reception by the chairman of the Scientific Organizing Committee**

### Tuesday May 8<sup>th</sup> a.m.

#### SESSION : ADVANCED FIELD ESTIMATION FOR INTERDISCIPLINARY SYSTEMS

- Chairperson:** VERRON J.  
LEGI-CNRS, Grenoble, France
- 09h00-09h35:  
*A singular Evolutive Extended Kalman filter to assimilate ocean colour data in a coupled physical-biochemical model of the North Atlantic*  
BRASSEUR P., CARMILLET V., BRANKART J.-M. AND VERRON J.  
LEGI-CNRS, Grenoble, France
- 09h35-10h10:  
*Coupled physical and biological data assimilative studies in Massachusetts Bay : II Multivariate statistics, adjustment, uncertainties and dynamics*  
LERMUSIAUX P. F.<sup>1</sup>, BESIKTEPE S. T.<sup>2</sup>. AND ROBINSON A.R.<sup>1</sup>  
1 Harvard University, Cambridge, USA  
2 Middle East Technical University, Erdemli, Turkey
- 10h10-10h45:  
*Coupled 3D physical and biological modelling of the mesoscale variability observed in NEA in Spring 1997*  
POPOVA E. E.<sup>1</sup>, LOZANO C. J.<sup>2</sup>, ROBINSON A. J.<sup>2</sup>, SROKOSZ M. A.<sup>1</sup>,  
HALEY P. J.<sup>2</sup> AND FASHAM M. J.<sup>1</sup>  
1 Southampton Oceanographic Centre, UK  
2 Harvard University, USA
- 10h45-11h15:  
Coffee, Poster session
- 11h15-11h50:  
*The Ensemble Kalman Filter and Smoother with one-dimensional ecosystem models*  
EVENSEN G.<sup>1</sup>, BREUILLIN C.<sup>2</sup> AND EKNES M.<sup>1</sup>  
1 Nansen Environmental and Remote Sensing Center, Norway  
2 L'Ecole Nationale Supérieure des Mines de Paris, France
- 11h50-12h25:  
*An ensemble Kalman filter for a 3-D marine ecosystem model*  
NATVIK L. -J. AND EVENSEN G.  
Nansen Environmental and Remote Sensing Center, Norway

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**Tuesday May 8<sup>th</sup> p.m.**

- **Chairperson:** ROBINSON A.  
University of Harvard, Cambridge, USA
- 14H00-14H35 ***Global Ocean Transports Estimated by Assimilating Ocean Data into a General Circulation Model***  
STAMMER D.  
Physical Oceanography Research Division, Scripps Institution of Oceanography, USA
- 14H35-15H10: ***Modeling California Current System Mesoscale Observations : Fitting Physics and Biology***  
MILLER A. J.<sup>1</sup>, DI LORENZO E.<sup>1</sup>, CORNUELLE B. D.<sup>1</sup>, NEILSON D. J.<sup>1</sup> AND MOISAN J. R.<sup>2</sup>  
1 Scripps Institution of Oceanography, USA  
2 NASA/GSFC Wallops Flight Facility, USA
- 15h10-15h45: ***Biological and chemical data assimilation in the model of two-component phytoplankton community***  
SEMOVSKI S. V. AND POPOVSKAYA G. I.  
Limnological Institute, Siberian Branch, Russian Academy of Sciences, Irkutsk, Russia
- 15h45-16h15: Coffee, Poster session
- 16h15-16h50 : ***Application of the OSSE methodology to high-resolution coastal physical/biogeochemical models : suggestions about the use of biological data assimilation in marine ecosystem modelling***  
VICHI M.<sup>1</sup>, RUARDIJ P.<sup>2</sup>, EBENHOEH W.<sup>3</sup> AND BARETTA J.W.<sup>4</sup>  
1 INGV, Roma, Italy  
2 NIOZ, Texel, The Netherlands  
3 C. Von Ossietzky Universität, Oldenburg, Germany  
4 RIKZ, Den Haag, The Netherlands
- 16h50-17h25: ***Coupled Physical-Acoustical Data Assimilation and Prediction of Uncertainties in a Shelf break Environment***  
LERMUSIAUX P.F.J.<sup>1</sup>, CHIU C.-S.<sup>2</sup>, ROBINSON A.R.<sup>1</sup>  
1 Harvard University, Cambridge, USA  
2 Naval Postgraduate School, Monterey, USA

**End of session**

**Wednesday May 9<sup>th</sup> a.m.**

### **SESSION : ESTIMATION OF INTERDISCIPLINARY PARAMETERS AND MODEL STRUCTURES**

- **Chairperson:** EVANS G.  
Fisheries and Oceans, St. Johns, Canada
- 09H00-09H30: ***Comparing JGOFS in-situ and ocean colour data with biogeochemical models in the subtropical Atlantic***  
DADOU I.<sup>1</sup>, EVANS G.<sup>2</sup> AND GARCON V.<sup>1</sup>  
1 GRGS/LEGOS, Toulouse, France  
2. Department of Fisheries and Oceans, Science Branch, Canada
- 9h30-10h00: ***A genetic-hybrid algorithm for model-centric data assimilation in ecosystem models***  
GROSSO R., CRISE A. AND CRISPI G.  
OGS, Trieste, Italy
- 10h00-10h30: ***Estimating the deep particle cycling rate constants in the tropical NE Atlantic (EUMELI sites) using a genetic algorithm***  
ATHIAS V., MAZZEGA P. AND JEANDEL C.  
LEGOS, CNRS/CNES/UPS, France
- 10h30-11h00: Coffee, Poster session
- 11H00-11H30: ***Weak constrained parameter estimation in a simple ecosystem model of the oceanic upper mixed layer : estimating the accuracy of parameterisations***  
RYABCHENKO V. A.<sup>1</sup>, KIVMAN G. A.<sup>2</sup> AND LOSA S. N.<sup>2</sup>  
1 P.P. Shirshov Institute of Oceanology, Russia  
2 Alfred-Wegener-Institut für Polar und Meeresforschung, Bremerhaven, Germany
- 11h30-12h00: ***Estimation of biological parameters of NEMURO – North pacific Ecosystem Model Used for Regional Oceanography – by data assimilation.***  
KISHI M. AND KURODA  
Graduate School of Fisheries Sciences, Hokkaido University, Japan
- 12h00-12h30: ***ESODAE: the NW European Shelf Seas Data Assimilation Experiment***  
CATTLE H. (ESODAE co-ordinator)  
Met Office, UK

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Wednesday May 9<sup>th</sup> p.m.

- Chairperson: VICH I M  
INGV, Roma, Italy
- 14h00-14h45:  
**Invited presentation** *Estimating ecosystem model parameters with assimilation of a long-term biogeochemical time series in a strongly dynamical system (the Southern Bight of the North Sea) : some lessons*  
SPITZ Y. H.<sup>1</sup>, LANCELOT C.<sup>2</sup> AND RUDDICK K.<sup>3</sup>  
1 College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, USA  
2 Ecologie des Systèmes Aquatiques, Université libre de Bruxelles, Belgium  
3 UGMM/BMM/MUMM, Brussels, Belgium
- 14h45-15h20:  
*A priori analysis of parameter identifiability and observation strategy for data assimilation in marine ecosystem model*  
SOLIDORO C.<sup>1</sup>, CRISE A.<sup>1</sup>, CRISPI G.<sup>1</sup> AND PASTRES R.<sup>1</sup>  
1 Istituto nazionale di Oceanografia e di Geofisica Sperimentale, OGS, Italy  
2 University of Venice, Italy  
Coffee, Poster session
- 15h20-15h35:  
- 15h35-15h55  
*Exploring the hydrodynamic and bio-geo-chemical processes of the Cretan Sea ecosystem with the use of a three dimensional system of models*  
TRIANTAFYLLOU G.N.<sup>1</sup>, PETIHAKIS G.<sup>1</sup>, ALLEN J.I.<sup>2</sup>, DOUNAS K.<sup>1</sup>  
1 Institute of Marine Biology of Crete, Greece  
2 Plymouth Marine Laboratory, UK
- 15h55-16h30:  
*Sequential weak constraint parameter estimation in an ecosystem model*  
LOSA S., KIVMAN G., SCHRÖTER J. AND WENZEL M.  
AWI, Germany
- 16h30-17h05:  
*Data assimilation used to optimise parameters of a coupled hydro-biogeochemical model.*  
LEREDDE Y.<sup>1</sup>, DIAZ F.<sup>1</sup>, MANTE C.<sup>1</sup>, MARSALEIX P.<sup>2</sup> AND ESTOURNEL C.<sup>2</sup>  
1 Centre d'Océanologie de Marseille, France  
2 Laboratoire d'Aérodynamique, Toulouse, France
- End of Session**  
- 20h00: **Colloquium Dinner at the Château de Colonster**

Thursday May 10<sup>th</sup> a.m

### SESSION : ASSIMILATION METHODOLOGIES FOR PHYSICAL AND INTERDISCIPLINARY SYSTEMS

- Chairperson: BRASSEUR P.  
LEGI-CNRS, Grenoble, France
- 09h00-09h30: *Validation of a Massively Parallel Ensemble Kalman Filter with a High-Resolution Pacific Ocean Circulation Model*  
KEPENNE C. L. AND RIENECKER M. M.  
NASA Goddard Space Flight Center, USA
- 09h30-10h00: *Assimilation of Topex/Poseidon altimeter data in the Tropical Pacific Ocean during the 1994-1998 period*  
PARENT L., VERRON J., TESTUT C.E. AND BRASSEUR P.  
Equipe MEOM, LEGI-Grenoble, France
- 10h00-10h30: *A 4D-Var scheme to correct surface boundary conditions in the tropical oceans*  
VOSSEPOEL F. C.<sup>1</sup>, WEAVER A.<sup>2</sup>, VIALARD J.<sup>3</sup> AND BOULANGER J.-P.<sup>1</sup>  
1 LODYC, France  
2 CERFACS, France  
3 ECMWF, UK
- 10h30-11h00: *A new hybrid forecasting system using neural network forecasted satellite imagery*  
RIXEN M., BARTH A. AND BECKERS J.-M.  
GHER, Université de Liège, Belgium
- 11h00-11h30: Coffee, Poster session  
- 11h30-12h00: *A truly variance minimizing ensemble filter and smoother*  
VAN LEEUWEN P. J.  
IMAU, Utrecht University, The Netherlands

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### Thursday May 10<sup>th</sup> p.m

- **Chairperson:** DE MEY P  
Centre National d'Etudes Spatiales, Toulouse, France
  
- 13h30-14h00: **Prototype Nowcast/Forecast System for Prince William Sound, Alaska**  
MOOERS C.N.K. AND BANG I.  
Ocean Prediction Experimental Laboratory, University of Miami, USA
- 14h00-14h30: **Efficient Kalman filtering algorithms with variance reduction**  
VERLAAN M., HEEMINK A.W.  
*ITS, Delft University of Technology, The Netherlands*
- 14h30-15h00: **Kalman Filtering with bias estimation for a transport model in the Odra Lagoon**  
BERTINO L.<sup>1</sup>, WACKERNAGEL H. <sup>1</sup> AND WOLF T. <sup>2</sup>  
1 Center of Geostatistics, EMP, France  
2 Institute for Hydrophysics, GKSS, Germany
- 15h00-15h30: **Adjoint equations and splitting technique for fast data assimilation and sensitivity studies**  
TSVETOVA E. AND PENENKO V.  
Institute of Computational Mathematics and Mathematical Geophysics SD RAS, Russia
- 15h30-16h00 : **Continuity preserving modified MCC technique**  
ZAVIALOV P.O.  
Shirshov Institute of Oceanology, Moscow, Russia
- 16h00-16h30: Coffee, Poster session
- 16h30-18h00: Presentation of posters and general discussion

**End of session**

### Friday May 11<sup>th</sup> a.m.

#### **SESSION : TOWARD OPERATIONAL INTERDISCIPLINARY OCEANOGRAPHY AND DATA ASSIMILATION**

- **Chairperson:** FIADEIRO M.  
Office of Naval Research International Field Office, Europe, London, EU
  
- 09h00-09h45: **Real-time Operational Forecasting of Coupled Biological and Physical Fields**  
ROBINSON A. R.<sup>1</sup>, ANDERSON L. A.<sup>1</sup>, BESIKTEPE S.<sup>2</sup>, DUSENBERRY J. A. <sup>1</sup>, HALEY P. J. <sup>1</sup>, LERMUSIAUX P. F.<sup>1</sup>, LESLIE W.G. <sup>1</sup> AND LOZANO C.J.<sup>1</sup>  
1 Harvard University, Cambridge, USA  
2 Middle East Technical University, Erdemli, Turkey
- 09h45-10h15: **Coupled physical and biological data assimilative studies in Massachusetts Bay : I. Real-time forecasts, model evaluation, data needs and dynamics**  
BESIKTEPE S. T. <sup>1</sup>, LERMUSIAUX P.F.J. <sup>2</sup> AND ROBINSON A. R. <sup>2</sup>  
1 Middle East Technical University, Erdemli, Turkey  
2 Harvard University, Cambridge, USA
- 10h15-10h45: **Results from the DIADEM Data Assimilation Experiment with an OGCM for the North Atlantic**  
EVENSEN G. <sup>1</sup>, VERRON J. <sup>2</sup>, VAN LEEUWEN P. J. <sup>3</sup>, BRANKART J.-M. <sup>2</sup>, BRASSEUR P. <sup>2</sup>, BRUSDAL K. <sup>1</sup>, DOMBROWSKY E. <sup>4</sup>, DRANGE H. <sup>1</sup>, HALBERSTADT G. <sup>3</sup> AND JACOBSEN L. M. <sup>1</sup>  
1 Nansen Environmental and Remote Sensing Center, Norway  
2 LEGI-CNRS, Grenoble, France  
3 Institute for Marine and Atmospheric Research, University of Utrecht, Holland  
4 Collecte Localisation Satellites, France  
5 Alfred Wegener Institute, Germany
- 10h45-11h15: Coffee, Poster session
- 11h15-11h45: **First results and applications of MERCATOR pre-operational forecasting in the North Atlantic**  
DOMBROWSKY E. <sup>1</sup>, GREINER E. <sup>1</sup>, BENKIRAN M. <sup>2</sup>, ALVEZ M. <sup>3</sup> AND DE MEY P. <sup>4</sup>  
1 CLS, France  
2 Coframi, France  
3 U. Azores, Portugal  
4. LEGOS, France

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11h45-12h15:

*A reduced-order Kalman filter to assimilate sea surface temperature and altimetric observations in a primitive equation model of the North Atlantic Ocean*

TESTUT C. E., BRANKART J.-M. BRASSEUR P. AND VERRON J.  
LEGI-CNRS, Grenoble, France

-  
12h15-12h45

*Satellite data assimilation in a 1/3 degree North Atlantic configuration of MICOM with an adaptative filter*

CHASSIGNET E.P.<sup>1</sup>, SMEDSTAD O.M.<sup>2</sup>, GAVART M.<sup>3</sup> AND  
BARAILLE R.<sup>3</sup>

1 University of MIAMI, USA  
2 Planning Systems, Inc., USA  
3 LEGI, Grenoble, France

**Friday May 11<sup>th</sup> p.m**

- **Chairperson:**

NIHOUL J.C.J.  
University of Liège, Belgium

- 14h00-14h30:

*A real time 1/16° global ocean nowcast/forecast system*  
SMEDSTAD O.M.<sup>1</sup>, HURLBURT H. E.<sup>2</sup>, METZGER E.J.<sup>2</sup>, RHODES R.C.  
<sup>2</sup>, SHRIVER J. F.<sup>2</sup>, WALLCRAFT A. J.<sup>2</sup> AND KARA A. B.<sup>3</sup>

1 Planning Systems, Inc., USA  
2 Naval Research Laboratory, USA  
3 Sverdrup Technology, Inc., USA

14h30-15h00:

*Assessments of the nested Forecasting Ocean Assimilation Model (FOAM) system*

BELL M.J., HINES A., McCULLOCH M.E. AND STORKEY D.  
The Met. Office, UK

-15h00-15h30

*Mediterranean forecasting during the MFS Pilot Project*

DEMIROV E.<sup>1</sup>, DE MEY P.<sup>2</sup> AND PINARDI N.<sup>3</sup>  
1 ISAO, Italy  
2 LEGOS, France  
3 Bologna University, Italy

- 15h30-16h00:

Coffee, Poster session



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### Poster session

#### ***A global optimization method for estimating the oceanic particle rate constants***

ATHIAS V., MAZZEGA P., JEANDEL C.  
*LEGOS, UMR 5566 CNRS/UPS, France*

#### ***Parameter estimation modelling the ecosystem dynamics in the North Atlantic***

BARCIELA R.M.<sup>1,2</sup>, FASHAM M.J.R.<sup>2</sup>, SROKOSZ M.A.<sup>1</sup>  
*1 James Rennell Division for Ocean Circulation and Climate, Southampton Oceanography Center, UK*  
*2 George Deacon Division, Southampton Oceanography Center, UK*

#### ***Assimilation of data into an ocean model with systematic errors near the equator***

BELL M.J.<sup>1</sup>, MARTIN M.J.<sup>2</sup>, NICHOLS N.K.<sup>2</sup>  
*1 The Met. Office, UK*  
*2 University of Reading, UK*

#### ***Assimilating XBT data into HYCOM***

ESENKOV O.<sup>1</sup>, THACKER C.<sup>2</sup>  
*1 CIMAS, University of Miami, USA*  
*2 Atlantic Oceanographic and Meteorological Laboratory, Miami, USA*

#### ***The DIADEM/TOPAZ ocean monitoring and prediction system***

EVENSEN G.<sup>1</sup>, VERRON J.<sup>2</sup>, Van LEEUWEN P.J.<sup>3</sup>, DOMBROWSKY E.<sup>4</sup>,  
SCROETHER J.<sup>5</sup>, ERLINGSSON B.<sup>6</sup>, HOEPFFNER N.<sup>7</sup>  
*1 Nansen Environmental and Remote Sensing Center, Norway*  
*2 Université Joseph Fourier, Laboratoire des Écoulements Géophysiques et Industriels, France*  
*3 Institute for Marine and Atmospheric Research, University of Utrecht, Holland*  
*4 Collecte Localisation Satellites, France*  
*5 Alfred Wegener Institute, Germany*  
*6 HALO Laboratory for Oceanic and Atmospheric Sciences, Iceland*  
*7 Joint Research Centre, EC*

#### ***Parameter Estimation in Coupled Ocean and Ecosystem Models***

FAUGERAS B.<sup>1</sup>, BLUM J.<sup>1</sup>, VERRON J.<sup>2</sup>, LEVY M.<sup>3</sup>, CHARPENTIER I.<sup>1</sup>  
*1 LMC-IMAG, Grenoble, France*  
*2 LEGI-CNRS, Grenoble, France*  
*3 LODYC-IPSL, Paris, France*

#### ***Adriatic Sea: data assimilation in a coupled physical-biological model. Preliminary results***

GARCIA-GORRIZ E., HOEPFFNER N., OUBERDOUS M.  
*ME-SAI, Joint Research Centre, Ispra, Italy*

#### ***Quantification of the nitrogen budget in the Black Sea using a 3D coupled hydrodynamical-biogeochemical model.***

GREGOIRE M.<sup>1</sup>, NEZLIN N.<sup>2</sup>, KOSTIANOV A.<sup>2</sup> and NIHOUL J.C.J.<sup>1</sup>  
*1 : GHER, university of Liège, 4000 Liège, Belgium*  
*2 : P.P. Shrivshov Institute of Oceanology, Moscow, Russia.*

#### ***Combining SeaWiFS chlorophyll observations with a coupled physical-biological model of the North Atlantic***

GUNSON J.<sup>1</sup>, GARCON V.<sup>2</sup>, OSCHLIES A.<sup>3</sup>  
*1 The Met. Office, UK*  
*2 LEGOS, France*  
*3 IFM, Germany*

#### ***Modelling the influence of ice coverage variability on The Ross Sea Plankton Assemblages.***

HECQ J.H.<sup>1</sup>, NORRO A.<sup>2</sup>, GOFFART A.<sup>1</sup>  
*<sup>1</sup>Ecohydrodynamics. University of Liege. Belgium*  
*<sup>2</sup>Management Unit of the North Sea Mathematical Model, Brussels, Belgium*

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### ***Biogeochemical cycling of nitrogen in the Black Sea oxic/anoxic water column***

KONOVALOV S.K., IVANOV L.I., SAMODUROV A.S.

*Marine Hydrophysical Institute, National Academy of Sciences of Ukraine*

### ***On the need to use data assimilation in a NW Mediterranean ecosystem model.***

LACROIX G.

*GHER, GeoHydrodynamics and Environment Research, Université de Liège, Belgium*

### ***On the optimisation of constants of a turbulence model***

LEREDDE Y.<sup>1</sup>, DEVENON J.-L.<sup>2</sup>, DEKEYSER I.<sup>1</sup>

*1 Centre d'Océanologie de Marseille, France*

*2 LSEET, Université de Toulon et du Var, France*

### ***Data assimilation in a marine ecosystem coupled to a mixed layer model of the upper ocean***

MAGRI S.<sup>1</sup>, BRASSEUR P.<sup>1</sup>, LACROIX G.<sup>2</sup>

*1 LEGI-CNRS, Grenoble, France*

*2 GHER, University of Liège, Belgium*

### ***Testing atypical sampling strategies in an idealised three dimensional ocean***

RIXEN M.<sup>1</sup>, ALLEN J.T.<sup>2</sup>, BECKERS J.-M.<sup>1</sup>

*1 GHER, University of Liège, Belgium*

*2 Southampton Oceanography Centre, UK*

### ***Lake Baikal surface advection field estimation using AVHRR-derived surface temperature and slicks of biological origin on ERS SAR image***

SEMOVSKI S.V.<sup>1</sup>, SEMENOV S.N.<sup>2</sup>, MOGILEV N.Y.<sup>2</sup>

*1 Limnological Institute SB RAS, Irkutsk, Russia*

*2 Institute of Solar-Terrestrial Physics SB RAS, Irkutsk, Russia*

### ***Exploring the hydrodynamic and bio-geo-chemical processes of the Cretan Sea ecosystem with the use of a three dimensional system of models***

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### ***Assimilation of river discharge data for investigating the circulation in the patos-mirim lagoon and the adjacent coastal ocean***

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