Tracer Methods in Geophysical Fluid Dynamics

Preliminary Programme (updated 19 april 2002)

Monday May 6th a.m.

- 09h00-10h00: Registration – Coffee

SESSION: Model validation against tracer distributions

Chairperson: J-C. GASCARD
Laboratoire d’Océanographie Dynamique et Climatologie, Université Pierre & Marie Curie, Paris, France

Towards Quantitative Evaluation of Ocean Tracer Model Simulations

ORR J.C.1, CALDEIRA K.G.2, TAYLOR K.E.3, OCMIP Group
1Laboratoire des Sciences du Climat et de l’Environnement, CEA-CNRS and IPSL, France
2Lawrence Livermore National Laboratory, USA
3PCMDI, Lawrence Livermore National Laboratory, USA

Interannual to Decadal Variability in air-sea CO2 fluxes for the Equatorial Pacific Ocean

RODGERS K.1, AUMONT O.2, BLANKE B.3, CAILIS P.1, DUTAY J-C.1, MADEG G.2, MONFRAY P.1, ORR J.1
1Laboratoire des Sciences du Climat et de l’Environnement, CEA-CNRS et IPSL, France
2Laboratoire d’Océanographie Dynamique et Climatologie, Université Pierre & Marie Curie, Paris, France
3Université de Brest, France
- 11h10-11h45 : Dissolved radionuclide measurements used for qualitative and quantitative calibration of hydrodynamic models in the English Channel and the North Sea; validation of « TRANSMER » model  
  BAILLY du BOIS P., 1 DUMAS F., 2   
  1IPSN/DPRE – Laboratoire d’Etudes Radioécologiques de la Façade Atlantique, France  
  2IFREMER/DÉL – Service des Applications Opérationnelles, France

- 11h45-12h20 : Evaluation of deep water circulation with natural C-14 and helium-3 during OCMIP-2  
  DUTAY J.-C., 1 JEAN-BAPTISTE P., 1 MAIER-REIMER E., 2  
  MATEAR R.J., 3 TODERDELL I., 4 MOUCHET A., 5 ORR J., 1  
  1Laboratoire des Sciences du Climat et de l’Environnement, CEA-CNRS and IPSL, Gif-sur-Yvette, France  
  2Max-Planck Institut für Meteorologie, Hamburg, Germany  
  3Commonwealth Science and Industrial Research Organization, Hobart, Australia  
  4Southampton Oceanography Centre, England  
  5Astrophysics and Geophysics Institute, University of Liege, Belgium

Monday May 6th p.m

SESSION : MODEL VALIDATION AGAINST TRACER DISTRIBUTIONS

- Chairperson: J.-C. DUTAY  
  Laboratoire des Sciences du Climat et de l’Environnement, CEA-CNRS and IPSL, France

- 14h00-14h35 : An anthropogenic radioisotope, Iodine 129, as a tracer for studying the northern limb of the Meridional Overturning Circulation (MOC)  
  GASCARD J.-C., 1 RAISBECK G., 1 YIOU F., 1  
  1Laboratoire d’Océanographie Dynamique et Climatologie, Université Pierre & Marie Curie, Paris, France

- 14h35-15h10 : Hindcasting the Uptake of Anthropogenic Trace Gases with an Eddy-Permitting Model of the Atlantic Ocean  
  CZESCHEL L., 1 BEISMAN J.-O., 1 BÖNING C.W., 1  
  1Institut für Meereskunde, Kiel, Germany

- 15h10-15h40 : Coffee break, Poster session

- 15h40-16h15 : Use of tracer method for calibrating and validating of numerical fluid dynamic models as an example of man-caused pollution along mouth region of North Dvina River study  
  DEBOLSKAYA E.I. 1  
  1Water Problems Institute of Russian Academy of Sciences, Russia

- 16h15-16h50 : Numerical Modeling of Bioluminescence Intensity  
  SHULMAN I., 1 HADDOCK S., 2 MCGILLICUDDY D., 3  
  PADUAN J., 4  
  1USM, USA  
  2MBARI, USA  
  3WHOI, USA  
  4NPS, USA

- 17h00 : Reception by the Chairman of the Scientific Organizing Committee
Tuesday May 7th a.m.

SESSION: Age: theory and applications

Chairperson: J. ORR
Laboratoire des Sciences du Climat et de l’Environnement, CEA-CNRS and IPSL, France

- 9h00-9h35: CAT, The Constituent-oriented Age Theory, and its application to marine flows
DELEERSNUIJDER E.1, DELHEZ E.J.M.2, MOUCHET A.5, BECKERS J-M.4
1Institut d’Astronomie et de Géophysique G. Lemaître, Université Catholique de Louvain, Belgium
2Modélisation et Méthodes Mathématiques, Université de Liège, Belgium
5Laboratoire de Physique Atmosphérique et Planétaire, Université de Liège, Belgium
4GeoHydrodynamics and Environment Research, Université de Liège, Belgium

- 9h35-10h10: A Generalized Transport Theory: Water-Mass Composition and Age
HAINÉ T.W.N.1, HALL T.M.2
1Earth & Planetary Sciences, Johns Hopkins University, USA
2NASA Goddard Institute for Space Studies, USA

- 10h10-10h45: Inferring the Age Spectrum from Transient Tracers
WAUGH D.W.1, HALL T.M.2, HAINÉ T.W.N.1, ZHANG H.1
1Department of Earth and Planetary Science, Johns Hopkins University, USA
2NASA Goddard Institute for Space Studies, USA

Tuesday May 7th p.m.

SESSION: Age: theory and applications

Chairperson: HALL T.
NASA Goddard Institute for Space Studies, USA

- 14h00-14h35: Analysis of multi-tracer ages in the Mediterranean Sea
KLEIN B.1, ROETHER W.1
1Department of Oceanography, University of Bremen, Germany

- 14h35-15h10: Ages and age distributions in the eastern Mediterranean
STEINFELDT R.1
1Institute of Environmental Physics, University of Bremen, Germany

- 15h10-15h45: Numerical modelling of the plume of the Rhône. Interpretation using the age of the fresh water tracer
GARREAU P.1
1IFREMER, centre de Brest, France

Coffee Break, Poster Session
- 16h15-16h50 : Validation of off-line versus on-line simulations: water age tracer as a tool to assess internal variability effects in OGCM
  CAMPIN J-M.\textsuperscript{1}, MOUCHET A.\textsuperscript{2}
  \textsuperscript{1}EAPS, MIT, USA
  \textsuperscript{2}LPAP, University of Liege, Belgium

- 16h50-17h25 : The time evolution of the tritium distribution in the North Pacific
  STARK S.\textsuperscript{1}, DONEY S.C.\textsuperscript{2}, JENKINS W.J.\textsuperscript{1}
  \textsuperscript{1}Southampton Oceanography Centre, UK
  \textsuperscript{2}National Center for Atmospheric Research, Boulder, USA

Wednesday May 8\textsuperscript{th} a.m.

SESSION : Tracers in regional pollution studies

- 9h00-9h30 : Fish larvae as an indicator of transport pattern, dispersion processes, and residence times in coastal waters: Observations and numerical simulations in the eastern English Channel
  SENTCHEV A.\textsuperscript{1}, KOROTENKO K.\textsuperscript{2}, KARPYTCHEV M.\textsuperscript{3}
  \textsuperscript{1}Université du Littoral – Côte d’Opale, Maison de la Recherche, Wimereux, France
  \textsuperscript{2}P.P. Shirshov Institute of Oceanology, Russia
  \textsuperscript{3}Université de La Rochelle, Centre littoral de Géophysique, France

- 9h30-10h00 : Evaluation of transport of fine-grained dredged material at the Belgian coast by the combined use of radio-active tracer experiments and numerical modelling
  VAN DEN EYNDE D.\textsuperscript{1}
  \textsuperscript{1}Management Unit of the North Sea Mathematical Models, Brussels, Belgium

- 10h00-10h30 : Coffee break, Poster session

- 10h30-11h00 : Transport of pollutants from potential sources in the Arctic Ocean via sea ice – an observational approach
  PAVLOV V.K.\textsuperscript{1}, PAVLOVA O.\textsuperscript{1}, KORSNES R.\textsuperscript{2}
  \textsuperscript{1}Norwegian Polar Institute, Norvège
  \textsuperscript{2}Arctic and Antartic Research Institute, Russia

- 11h00-11h30 : Artificial radioactive tracers as indicators of mixing processes in the Kara and White Seas
  DANILOV A.I.\textsuperscript{1}, IVANOV L.M.\textsuperscript{2}, MARGOLINA T.M.\textsuperscript{2}
  \textsuperscript{1}Arctic and Antartic Research Institute, Russia
  \textsuperscript{2}Marine Hydrophysical Institute, Ukraine

- 11h30–12h00 : Spreading of riverine waters in the Arctic Basin
  DVORNIKOV A.Y\textsuperscript{1}, RYABCHENKO V.A.\textsuperscript{1}, ALEXEEV G.V.\textsuperscript{2}, NEELOV I.A.\textsuperscript{2}
  \textsuperscript{1}St-Petersburgh Branch, P.P. Shirshov Institute of Oceanology, Russia
  \textsuperscript{2}Arctic and Antarctic Research Institute, Russia

- 12h00–12h30 : Numerical Simulation of the Mechanisms affecting the Setting Up of Estuarine Turbidity Maxima
  RUIZ VILLAREAL M.\textsuperscript{1}, BURCHARD H.\textsuperscript{1}
  \textsuperscript{1}Institute of Oceanography, University of Hamburg, Germany
SESSION: Tracers in regional pollution studies

- Chairperson: I. SHULMAN
USM, USA

- 14h00-14h30: Using tracers in a coupled climate model to investigate anthropogenic changes in SubAntartic Mode Water
BANKS H.T.1, WOOD R.A.1, GREGORY J.M.1
1Hadley Centre for Climate Prediction and Research, Met Office, UK

- 14h30-15h00: Black Sea Horizontal Mixing Studies Based on Satellite Imagery, Argos-tracked drifters and CTD Survey
ZATSEPIN A.1, ZHURBAS V.1, EVDOSHENKO M.1, GINZBURG A.1, KOSTIANOY A.1, KREMENETSKY B.V.1, POYARKOV S.1, SHEREMET N.1, STROGANOV O.1, KRIVOSHEYA V.2, SKIRTA A.2, YAKUBENKO V.2, EREMEEV V.3, MOTYZHOV S.3, RATNER Y.3, SOLOVIEV D.3, STANICHNY S.3, POULAIN P-M.4
1P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Russia
2South Dept. of P.P. Shirshov Institute of Oceanology, Russia
3Marine Hydrophysical Institute, Ukraine
4Department of Oceanography, Naval Postgraduate School, USA

- 15h00-15h30: Particle tracking technique in an operational system for the prediction warfare chemical pollution dumped in Baltic Sea
KOROTENKO K.A.1
1P.P. Shirshov Institute of Oceanology, Russia

- 15h30-16h00: Coffee break, Poster session

- 16h00-16h30: Submarine monitors and tracer methods for investigations of groundwater discharge into the coastal zone
KONTAR E.A.1
1P.P. Shirshov Institute of Oceanology Russian Academy of Sciences, Russia

- 16h30-17h00: Xenobiotic fluorescent compounds as river water tracers
SUIJLEN J-M.1, GIESE H.1, SPANHOFF R.1, SAETRE R.1
1Rijkswaterstaat, National Institute for Coastal & Marine Management / RIKZ, The Hague, The Netherlands
2IMR, Bergen, Norway

Thursday May 9th a.m

SESSION: ANALYSIS OF DATA BASE

- Chairperson: B. KLEIN
Institute of Environmental Physics, Department of Tracer-Oceanography, Bremen, Germany

- 9h00-9h30: Building Global Ocean Profile-Plankton Databases for Scientific Research
LEVITUS S.1
1World Data Center for Oceanography, Silver Spring, USA
- 9h30-10h00 : A hydrographic and bio-chemical climatology of the Mediterranean and Black Seas: a useful tool to trace water masses
RIXEN M. 1*, BECKERS J-M. 2, MAILLARD C. 3
1 Southampton Oceanography Center, UK
2 GHER, University of Liège, Belgium
3 SISMER, IFREMER, France

- 10h00-10h30 : Coffee break, poster session

- 10h30-11h00 : The path of QC and methods used to determine vertical climatology of conservative and non-conservative tracers in coastal zone/open sea areas in the Central Mediterranean Sea
BURCA M. 2, FONTANI S. 3, GIORGETTI A. 1, MANZELLA G.M.R. 3
1 Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Trieste, Italy
2 National Institute for Marine Research & Development « Grigore Antipa », Romania
3 IFREMER/SISMER, France

- 11h00-11h30 : Water masses, Circulation and Eddy Energetics in the Cretan Straits (Antikithira and Kassos Straits) during 1997-1998
KONTOYIANNIS H. 1, BALOPOULOS E. 1, PAPAGEORGIU E. 1, PAPADOPOULOS V. 1, IONA A. 1
1 National Center for Marine Research, Athens, Greece

- 11h30-12h00 : Physical and biochemical averaged vertical profiles, an important tool to trace water masses climatology in the Mediterranean regions and to validate incoming data
MANCA B. 1*, BURCA M. 2, GIORGETTI A. 3, COATANOAN C. 3
1 Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Trieste, Italy
2 National Institute for Marine Research & Development « Grigore Antipa », Romania
3 IFREMER/SISMER, France

Thursday May 9th p.m

SESSION: INVERSE TECHNIQUES

- Chairperson: P.E. ROBBINS
Scripps Institution of Oceanography, La Jolla, USA- 14h00-14h35 :

Tracer modeling by means of direct and inverse techniques
TSVETOVA E.A. 1, PENENKO V.V. 1
1 Institute of Computational Mathematics and Mathematical Geophysics SD RAS, Russia

The use of tracers for remote monitoring of climate variability in water mass formation regions
TOMCZAK M. 1
1 School of Chemistry, Physics and Earth Sciences, The Flinders University of South Australia, Australia
- 15h10-15h45 : \textit{Spatial and Temporal Impacts of Ocean General Circulation on Carbon Sequestration}  
\hspace{1cm} HILL C.\(^1\), BUGNION V.\(^1\), CAMPIN J-M.\(^1\), FOLLOWS M.\(^1\), MARSHALL J.\(^1\), \(^1\)EAPS, MIT, USA

- 15h45-16h15 : \textit{Coffee break, Poster session}

- 16h15-16h45 : \textit{Red Sea deep water circulation inverse modeling using the \(^3\)He tracer field}  
\hspace{1cm} JEAN-BAPTISTE P.\(^1\), FOURRE E.\(^1\), METZL N.\(^2\), TERNON J-F.\(^3\)  
\hspace{1cm} \(^1\)Laboratoire des Sciences du Climat et de l’Environnement, Saclay, France  
\hspace{1cm} \(^2\)Laboratoire de Physique et Chimie Marines, Université de Paris 6, France  
\hspace{1cm} \(^3\)IRD, Cayenne, Guyane Française

- 16h45-17h15 : \textit{Tracer experiments as a means for determining energy spectra of horizontal water movement in the sea}  
\hspace{1cm} VAN DAM G.C.\(^1\)  
\hspace{1cm} \(^1\)Aqua System International, Poeldijk, The Netherlands

Friday May 10\textsuperscript{th} a.m.  

\textbf{SESSION : ADVECTION / MIXING OF TRACERS}

- 9h00-9h35 : \textit{Covert advection pathways in the Gulf of Mexico}  
\hspace{1cm} TONER M.\(^1\), POJE A.C.\(^2\), KIRWAN A.D. Jr.\(^1\), KANTHA L.\(^3\), KUZNETSOV L.\(^4\), JONES C.K.R.T.\(^4\)  
\hspace{1cm} \(^1\)College of Marine Studies, University of Delaware, USA  
\hspace{1cm} \(^2\)College of Staten Island, City University of New York, USA  
\hspace{1cm} \(^3\)Colorado Center for Astrodynamics Research, University of Colorado, USA  
\hspace{1cm} \(^4\)Lefschetz Center for Dynamical Systems, Brown University, USA

- 9h35-10h10 : \textit{Modelling intermittent small-scale mixing}  
\hspace{1cm} VANNESTE J.\(^1\)  
\hspace{1cm} \(^1\)Department of Mathematics and Statistics, University of Edinburgh, UK

- 10h10-10h40 : \textit{Using a tracer-based co-ordinate system to obtain a quantification of transport and mixing}  
\hspace{1cm} SHUCKBURGH E.\(^1\), HAYNES P.\(^2\)  
\hspace{1cm} \(^1\)Laboratoire de Météorologie Dynamique, Ecole Normale Supérieure, Paris, France  
\hspace{1cm} \(^2\)Department of Applied Mathematics and Theoretical Physics, Cambridge, UK

- 10h40-11h15 : \textit{On the relationship between tracer microstructure and coarse-grained « effective diffusivity »}  
\hspace{1cm} NAKAMURA N.\(^1\)  
\hspace{1cm} \(^1\)Department of Geophysical Sciences, University of Chicago, USA

- 11h15-11h50 : \textit{A multiple cell flat level model for ocean tracer dispersion}  
\hspace{1cm} LI K.J-G.\(^1\), KILWORTH P.D.\(^1\), SMEED D.A.\(^1\)  
\hspace{1cm} \(^1\)Southampton Oceanography Centre, University of Southampton, UK

- Chairperson: M. TOMCZAK  
\hspace{1cm} School of Chemistry, Physics and Earth Sciences, The Flinders  
\hspace{1cm} University of South Australia
Poster sessions

Black Sea Marine Meteorology Database
BELOKOPYTOV V.
Marine Hydrophysical Institute, Sebastopol, Ukraine

Modelling CFC distributions with a global ocean model employing non-uniform mixing parameterizations
GRIESEL A., MORALES MAQUEDA M.A.M. and MONTOYA M
PIK Postdam Institute for Climate Impact Research, Postdam

Numerical Drifter Experiments in the Black Sea
KOROTENKO K.A.
P.P. Shirshov Institute of Oceanology, Russia

New approach for modeling evaporation in particle tracking models for simulation of oil spill transport and dispersal in the sea
KOROTENKO K.A. and KOROTENKO L.A.
P.P. Shirshov Institute of Oceanology, Russia

Development of an "activable" stable element tracer technique in an estuarine environment using Neutron Activation Analysis in support of Estuarine pollution modelling
LLOYD A. and PARRY S.J.
1 Departement of Environmental Science and Technology, Imperial College School of Science Technology and Medicine, London, UK
2 Neil Lynn, Department of Nuclear Science and Technology

A new approach for the use of CFCs and CCl4 as transient tracers in water masses formed by deep convection - Determination of the Labrador Sea Water age in the Northeast Atlantic
PRUVOST J., MORIN P. LE CANN B. and LE CORRE P.
1 Institut Universitaire Européen de la Mer et Observatoire Océanologique de Roscoff, France
2 CNRS / Laboratoire de Physique des Océans, France

Fate of biological and chemical tracers in lake Baikal under-ice convective layer-"large-eddy" simulation for
PUSHITOV P.Y., LEVLEV K.V., OVCHINNIKOVA T.E., SEMOVSKI S.V.
1 Institute for Water and Environmental Problems SB RA, Novosibirsk, Russia
2 Limnological Institute RS RA, Irkutsk, Russia

Autoregressive analysis of the North Atlantic Oscillation
RYBAK O. and RYBAK E.
Scientific Research Centre of the Russian Academy of Sciences, Sochi, Russia

Vertical structure of nutrients in deep lake - tracers of biological processes and hydrodynamics
SHIMARAEV M.N., DOMYSHEVA V.N., SEMOVSKI S.V.
Limnological Institute RS RA, Irkutsk, Russia

Atlases of Climatic Characteristics of Low Boundary of Oxic Waters and Upper Boundary of Anoxic Waters of the Black Sea
SUVOVOROV A.M., GODIN E.A. and KHALIULIN A.KH
Marine Hydrophysical Institute, Sevastopol, Ukraine

Oceanographic Data and Knowledge Bases Management System
SUVOVOROV A.M., INGEROV A.V. and KHALIULIN A.KH
Marine Hydrophysical Institute, Sevastopol, Ukraine
Information resources of marine institutes and centres of Ukraine: the contribution into Medar/Medatlas II project
SUVOVOV A.M., GODIN E.A. and KHALIULIN A.KH
Marine Hydrophysical Institute, Sevastopol, Ukraine

Estimation of long-term variability of oceanographic parameters
SUVOVOV A.M., GODIN E.A. and KHALIULIN A.KH
Marine Hydrophysical Institute, Sevastopol, Ukraine

Tracer Observations use in sea-land ecological economic system
TIMCHENKO I.E. and IGUMNOVA E.M.
Marine Hydrophysical Institute, Sevastopol, Ukraine

The new ABC-technology for environmental quality control in Sea-Land ecological economic systems
TIMCHENKO I.E. and IGUMNOVA E.M.
Marine Hydrophysical Institute, Sevastopol, Ukraine

Tracer experiments as a means for determining energy spectra of horizontal water movement in the sea
Van DAM G.C. and SUIJLEN J.M.
1 Aqua Systems International, Poeldijk, the Netherlands
2 Rijkswaterstraat, National Institute for Coastal and Marine Management, RIKZ, the Netherlands

Formation of anoxic conditions in the Sea of Azov as a result of hydrophysical structure changes in July 2001 (observations and modeling)
YAKUSHEV E.V.
Southern Branch of the P.P. Shirshov Institute of Oceanology RAS, Russia
Black Sea Horizontal Mixing Studies Based on Satellite Imagery, Argo-tracked Drifters and CTD Survey

1 P.P. Shirshov Institute of Oceanology, Moscow, Russia
2 Southern Branch of the P.P. Shirshov Institute of Oceanology RAS, Russia
3 Marine Hydrophysical Institute, Sevastopol, Ukraine
4 Department of Oceanography, Naval Postgraduate School, Monterey, USA.