International Liège Colloquium on Ocean Hydrodynamics

Prof. Jacques C.J. NIHOUL, *Modelenvironment*
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Tel. : +32-4-366 33 50 — Fax : +32-4-366 23 55 — e-mail : j.nihoul@ulg.ac.be

- **34rd INTERNATIONAL LIEGE COLLOQUIUM ON OCEAN HYDRODYNAMICS**
Liège, Belgium, May 6-10 2002

Tracer Methods in Geophysical Fluid Dynamics

Preliminary Programme (updated 19 april 2002)

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)
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- 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 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

- 10h00-10h35 : ***Towards Quantitative Evaluation of Ocean Tracer Model Simulations***
ORR J.C.[1], CALDEIRA K.G.[2], TAYLOR K.E.[3], OCMIP Group
[1]*Laboratoire des Sciences du Climat et de l'Environnement, CEA-CNRS and IPSL, France*
[2]*Lawrence Livermore National Laboratory, USA*
[3]*PCMDI, Lawrence Livermore National Laboratory, USA*

- 10h35-11h10 : ***Interannual to Decadal Variability in air-sea CO2 fluxes for the Equatorial Pacific Ocean***
RODGERS K.[1], AUMONT O.[2], BLANKE B.[3], CIAIS P.[1], DUTAY J-C.[1], MADEC G.[2], MONFRAY P.[1], ORR J.[1]
[1]*Laboratoire des Sciences du Climat et de l'Environnement, CEA-CNRS et IPSL, France*
[2]*Laboratoire d'Océanographie Dynamique et Climatologie, Université Pierre & Marie Curie, Paris, France*
[3]*Université de Brest, France*

LIEGE

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- 11h10-11h45 : ***Dissolved radionuclide measurements used for qualitative an 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]
[1]IPSN/DPRE – Laboratoire d'Etudes Radioécologiques de la Façade Atlantique, France
[2]IFREMER/DEL – 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]
[1]Laboratoire des Sciences du Climat et de l'Environnement, CEA-CNRS and IPSL, Gif-sur-Yvette, France
[2]Max-Planck Institut für Meteorologie, Hamburg, Germany
[3]Commonwealth Science and Industrial Research Organization, Hobart, Australia
[4]Southampton Oceanography Centre, England
[5]Astrophysics 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]
[1]Laboratoire 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], BEISMANN J-O.[1], BÖNING C.W.[1]
[1]Institut 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]
[1]Water 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]
[1]USM, USA
[2]MBARI, USA
[3]WHOI, USA
[4]NPS, USA

- 17h00 : **Reception by the Chairman of the Scientific Organizing Committee**

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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***
DELEERSNIJDER E.[1], DELHEZ E.J.M.[2], MOUCHET A.[5], BECKERS J-M.[4]
[1]*Institut d'Astronomie et de Géophysique G. Lemaître, Université Catholique de Louvain, Belgium*
[2]*Modélisation et Méthodes Mathématiques, Université de Liège, Belgium*
[3]*Laboratoire de Physique Atmosphérique et Planétaire, Université de Liège, Belgium*
[4]*GeoHydrodynamics and Environment Research, Université de Liège, Belgium*

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

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

- 10h45-11h15 : *Coffee Break, Poster Session*

- 11h15-11h50 : ***Inferring anthropogenic carbon inventories in the ocean from tracers***
HALL T.M.[1], WAUGH D.W.[2], HAINE T.W.N.[2]
[1]*NASA Goddard Institute for Space Studies, USA*
[2]*Johns Hopkins University, USA*

- 11h50-12h25 : ***Estimates of Oceanic Anthropogenic Carbon based on Chloroflourocarbon Inventories***
ROBBINS P.E.[1]
[1]*Scripps Institution of Oceanography, La Jolla, USA*

Tuesday May 7th p.m.

SESSION : Age : theory and applications

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

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

- 14h35-15h10 : ***Ages and age distributions in the eastern Mediterranean***
STEINFELDT R.[1]
[1]*Institute 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]
[1]*IFREMER, centre de Brest, France*

- 15h45-16h15 : *Coffee break, Poster session*

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- 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.[1], MOUCHET A.[2]
[1]*EAPS, MIT, USA*
[2]*LPAP, University of Liege, Belgium*

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

Wednesday May 8th a.m.

SESSION : Tracers in regional pollution studies

- **Chairperson**: FIADEIRO M.
Office of Naval Research International Field Office, Europe, London, EU

- 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.[1], KOROTENKO K.[2], KARPYTCHEV M.[3]
[1]*Université du Littoral – Côte d'Opale, Maison de la Recherche,Wimereux, France*
[2]*P.P. Shirshov Institute of Oceanology, Russia*
[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.[1]
[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.[1], PAVLOVA O.[1], KORSNES R.[2]
[1]*Norwegian Polar Institute, Norvège*

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

- 11h30–12h00 : ***Spreading of riverine waters in the Arctic Basin***
DVORNIKOV A.Y[1], RYABCHENKO V.A.[1], ALEXEEV G.V.[2], NEELOV I.A.[2]
[1]St-Petersburgh Branch, P.P. Shirshov Institute of Oceanology, Russia
[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.[1], BURCHARD H.[1]
[1]*Institute of Oceanography, University of Hamburg, Germany*

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Wednesday May 8th p.m.

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]
[1]*Hadley 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], KREMENETSKIY 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]
[1]*P.P. Shirshov Institute of Oceanology, Russia*
[2]*South Dept. of P.P. Shirshov Institute of Oceanology, Russia*
[3]*Marine Hydrophysical Institute, Ukraine*
[4]*Department 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]
[1]*P.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]
[1]*P.P. Shirshov Institute of Oceanology Russian Academy of Sciences, Russia*
[1]*Norwegian Polar Institute, Tromso, Norway*
[2]*FFI, dep. E. Kjeller, Norway*

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

- 20h00 : **Colloquium dinner at the Château of Colonster**

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]
[1]*World Data Center for Oceanography, Silver Spring, USA*

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- 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 and Development « Grigore Antipa », Romania*
[3]*Marine Environment Research Centre – ENEA, La Spezia, Italy*

- 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*

12h00-12h30 : ***Space and Time Distribution of Phosphate in the Mediterranean Sea***
KARAFISTAN A.[1], BECKERS J-M.[2]
[1]*Onsekiz Mart Universitesi, SÜF Departement of Fisheries, Turkey*
[2]*GHER, University of Liège, Belgium*

Thursday May 9th p.m

SESSION : INVERSE TECHNIQUES

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

- 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*

- 14h35-15h10 : ***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*

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- 15h10-15h45 : ***Spatial and Temporal Impacts of Ocean General Circulation on Carbon Sequestration***
HILL C.[1], BUGNION V.[1], CAMPIN J-M.[1], FOLLOWS M.[1], MARSHALL J.[1],
[1]*EAPS, MIT, USA*

- 15h45-16h15 : *Coffee break, Poster session*

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

- 16h45-17h15 : ***Tracer experiments as a means for determining energy spectra of horizontal water movement in the sea***
VAN DAM G.C.[1]
[1]*Aqua System International, Poeldijk, The Netherlands*

Friday May 10th a.m.

SESSION : ADVECTION / MIXING OF TRACERS

- **Chairperson**: M. TOMCZAK
School of Chemistry, Physics and Earth Sciences, The Flinders University of South Australia

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

- 9h35-10h10 : ***Modelling intermittent small-scale mixing***
VANNESTE J.[1]
[1]*Department of Mathematics and Statistics, University of Edinburgh, UK*

- 10h10-10h40 : *Coffee break, Poster session*

- 10h40-11h15 : ***Using a tracer-based co-ordinate system to obtain a quantification of transport and mixing***
SHUCKBURGH E.[1], HAYNES P.[2]
[1]*Laboratoire de Météorologie Dynamique, Ecole Normale Supérieure, Paris, France*
[2]*Department of Applied Mathematics and Theoretical Physics, Cambridge, UK*

- 11h15-11h50 : ***On the relationship between tracer microstructure and coarse-grained « effective diffusivity »***
NAKAMURA N.[1]
[1]*Department of Geophysical Sciences, University of Chicago, USA*

- 11h50-12h25 : ***A multiple cell flat level model for ocean tracer dispersion***
LI K.J-G.[1], KILWORTH P.D.[1], SMEED D.A.[1]
[1]*Southampton Oceanography Centre, University of Southampton, UK*

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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 Institue 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 CCI4 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
SUVOROV A.M., GODIN E.A. and KHALIULIN A.KH
Marine Hydrophysical Institute, Sevastopol, Ukraine

Oceanographic Data and Knowledge Bases Management System
SUVOROV A.M., INGEROV A.V. and KHALIULIN A.KH
Marine Hydrophysical Institute, Sevastopol, Ukraine

LIEGE

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Information resources of marine institutes and centres of Ukraine: the contribution into Medar/Medatlas II project
SUVOROV A.M., GODIN E.A. and KHALIULIN A.KH
Marine Hydrophysical Institute, Sevastopol, Ukraine

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

Traser 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, Argos-tracked Drifters and CTD Survey

ZATSEPIN A., ZHURBAS V., EVDOSHENKO M., GINZBURG A., KOSTIANOY A., KREMENETSKIY V., POYARKOV S., SHEREMET N., STROGANO O., KRIVOSHEYA V. SHIRTA A., YAKUBENKO V., EREMEEV V., MOTYZHOV S., RATNER Y., SOLOVIEV D., STANICHNY S., POULAIN J-M.
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.