Mémorial Gabriel Chabert d'Hières
Prospective sur la nouvelle plate-forme Coriolis
18-19 Mars 2014

Le premier jour sera une commémoration scientifique de Gabriel Chabert d'Hières à travers les témoignages d'anciens collègues ou plus jeunes chercheurs inspirés par ses recherches. Gabriel Chabert d'Hières, décédé le 10 mai 2012, a mené la construction de la grande plate-forme tournante "Coriolis" de Grenoble qu'il a dirigé jusqu'à sa retraite en 1994. Il a ainsi fait évoluer un modèle réduit de la Manche en une installation polyvalente unique, attirant une communauté de recherche internationale dans la dynamique de l'océan et de l'atmosphère. L'après-midi sera consacrée à quelques expériences de démonstration à la présentation de développements plus récents.

Le deuxième jour (19 Mars) sera consacré à la présentation de la nouvelle plate-forme Coriolis, en phase finale de construction, et à des présentations de prospective scientifique.
Site nouvelle plate-forme: http://www.legi.grenoble-inp.fr/web/spip.php?rubrique10&lang=en .

Notez aussi que le 20 Mars à partir de 14h, le professeur Harindra Joe Fernando, participant à la prospective et ami de Gabriel Chabert d'Hières, recevra un doctorat honoris causa de l'Université Joseph Fourier et donnera une conférence à cette occasion, amphi Weil (accès libre).

Ces journées sont ouvertes à toutes et à tous**,** mais pour des questions pratiques d'organisation nous demandons aux participants de s'inscrire à l'adresse suivante : https://docs.google.com/forms/d/13JSu5NPGaODKnAr54VW3IT02wBu5czznzShwUfWoe14/viewform . La journée 'mémorial' s'adresse à un large public, tandis que la journée 'prospective', en Anglais, sera plus technique.

- Lieux : (voir plan d'accès page suivante)
  - **Mardi 18 Mars:** LEGI, Amphi du Batiment K, 1209-1211 rue de la piscine, Domaine Universitaire de Saint Martin d'Hères.
  - **Mercredi 19 Mars:** Amphi Vaujany, bâtiment 'Pluriel' (ex-CNAM) de Grenoble-INP, 701 rue de la Piscine, domaine universitaire de St Martin d'Hères**.**

- Contacts :
  - Joel Sommeria (LEGI - 04 76 82 52 80 - joel.sommeria@legi.cnrs.fr)
  - Samuel Viboud (LEGI - 04 76 82 51 01 - samuel.viboud@legi.cnrs.fr)

- Programme:
  voir pages suivantes

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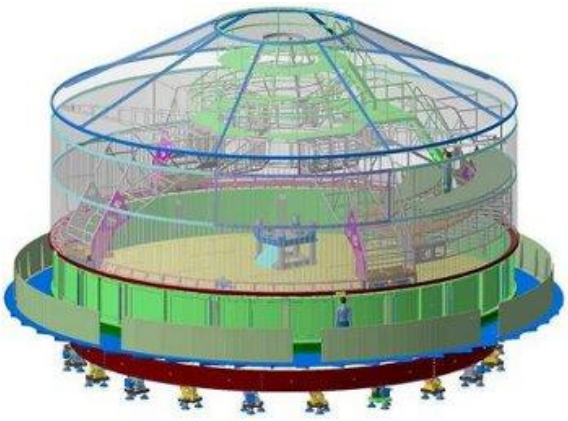

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Accès

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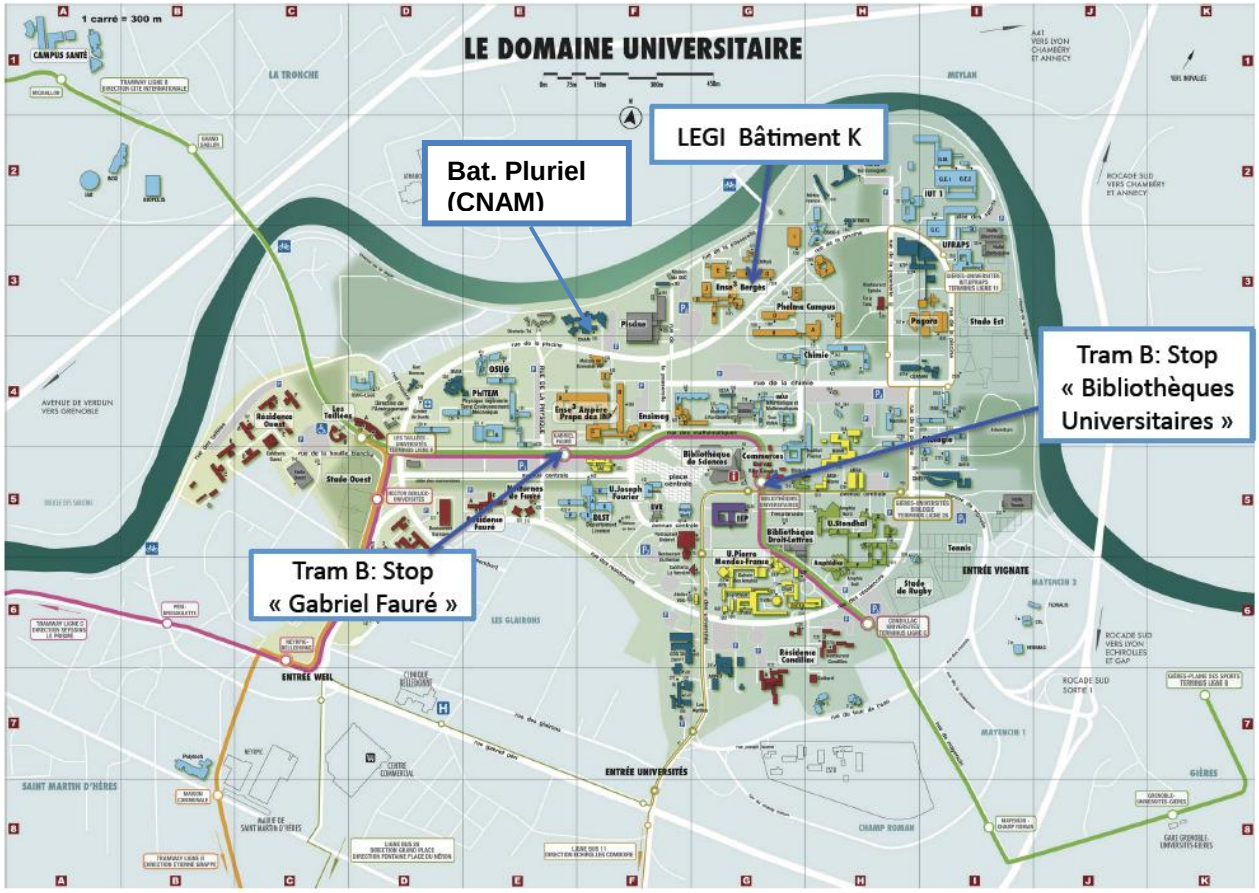
Accueil LEGI
Bâtiment K



En voiture : En provenance de Lyon, Valence, Chambéry par autoroutes (A48, A49, A41), suivre la rocade sud. Prendre la sortie Domaine Universitaire. En provenance de Grenoble ville, prendre l'avenue Gabriel Péri (St Martin d'Hères), entrée 1 (face à Géant)

En transports en commun : La ligne B du tram permet d'aller du centre ville au campus en 25 mn

Mardi 18 Mars: mémorial

LEGI, Amphi du Batiment K

8h30 Café et Accueil

9h00 - 10h30 Session 1 : témoignages de collègues

Joël Sommeria (LEGI) 30 mn
50 ans d'histoire de la plate-forme Coriolis: de l'ingénierie aux écoulements naturels

René Moreau (Grenoble-INP, Académie des Sciences) 30 mn
Souvenirs des années 1960 autour de Gabriel Chabert d'Hières

Henri Didelle (LEGI) 30 mn
35 ans aux côtés de Gabriel Chabert d'Hières

10h30 - 11h Pause café

11h - 12h20 Session 2 **:** quelques collaborations internationales

Peter Davies (University of Dundee, UK) 20 mn
Obstacle wakes and boundary currents on the Coriolis platform

Dieter Etling (Inst. für Meteorologie und Klimatologie, Leibniz Univ. Hannover, Allemagne) 20 mn
Laboratory analogues of atmospheric motions

Tom Mc Climans (SINTEF, Trondheim, Norvège) 20 mn
Some coastal current and convection studies

Michel Crépon (Lodyc, Paris) 20 mn
Gabriel and the Mediterranean Sea: a new description of the Sicily Strait circulation

12h20 - 14h Buffet sur place pour les participants

14h -15h30 Visite de la nouvelle plate-forme Coriolis et expériences de démonstration:
Pendule de Foucault, colonnes de Taylor, couches d'Ekman, panaches convectifs

15h30- 17h30 Session 3 : développements ultérieurs

Louis Gostiaux (LMFA, Lyon) 30 mn
Internal tide and soliton generation

Jan-Bert Flor (LEGI) 30 mn
Cyclone motions and interactions

Frederic Moisy 30 mn
Effect of rotation on turbulence

Bernard Barnier (LEGI) 30 mn
From tide studies to the modelling of global ocean and climate

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Mercredi 19 Mars: prospective

Amphi Vaujany, bâtiment 'Pluriel' (ex-CNAM) of Grenoble-INP

9h00 - 10h30 Session 1: the new Coriolis platform

Henri Didelle (LEGI) 15 mn
Gabriel Chabert d'Hières and Coriolis II.

Jérôme Lacipière (Seras-Institut Néel, Grenoble) 15 mn
Mechanical conception of the project Coriolis II

Samuel Viboud (LEGI) 15 mn
State of advancement of the project

Joël Sommeria (LEGI) 15 mn
Overview of the scientific program

Joe Harindra Fernando *(*College of Engineering, Univ. Notre-Dame, Indiana) 30 mn
From laboratory to climate: understanding multi-scale processes through Observations

10h30 - 11h Coffee break

11h00 - 12h30 Session 2

Peter Read *(*Univ. Oxford) 30 mn
Experiments on geostrophic turbulence and convection

Enrico Ferrero **(**Università del Piemonte Orientale **)** 15 mn
Simulation of atmospheric microbursts in rotating tank

Chantal Staquet (LEGI) 15 mn
Modelling down-slope winds in Alpine valleys

Olivier Eiff (IMFT Toulouse) 15 mn
Decaying stratified turbulence in the laboratory

Pierre Augier (DAMTP, Univ. of Cambridge) 15 mn
Perspectives in rotating stratified turbulence

12h 30 - 14h: Lunch buffet

14h -15 h: Visit of the installation

15h -16h30 Session 3

Tamay Ozgokmen Div. Meteorology and Phys. Oceanography, Rosenstiel School of Marine and Atmospheric Science, Miami, Florida. 30 mn
Upper ocean processes: overview by the Consortium for Advanced Research on Transport of Hydrocarbon in the Environment (CARTHE)

Antoine Venaille (ENS Lyon) 15 mn
Vertical structure of geostrophic turbulence

Geoffroy Lesur **(**IPAG, Grenoble**)** 15 mn
Instabilities and eddies in proto-planetary disks

Damien Sous (MIO**,** Univ. Toulon) 15 mn
Sediment transport, bedforms and roughness effects

Eric Barthelemy (LEGI) 15 mn
Nearshore morphodynamics and grain size sorting

16h30 -17h Discussion

ABSTRACTS MEMORIAL (March 18th)

Joël Sommeria (LEGI)

50 ans d'histoire de la plate-forme Coriolis: de l'ingénierie aux écoulements naturels

En 1960, Gabriel Chabert d'Hières a dirigé la construction de la grande plate-forme tournante "Coriolis" de Grenoble initialement destinée à modéliser les courants de marée dans la Manche en lien avec un projet ambitieux de centrale électrique marémotrice barrant la baie du Mont St Michel. Il a ensuite fait évoluer cette installation en un équipement unique au monde, permettant de simuler la dynamique de l'océan et de l'atmosphère. Il a ainsi rassemblé une communauté internationale et devint un pionnier des programmes Européens d'accès aux grandes installations expérimentales. Ce parcours sera résumé ici après une brève introduction sur la force de Coriolis et la mécanique des milieux naturels.

René Moreau (Grenoble-INP, Académie des Sciences)

Souvenirs des années 1960 autour de Gabriel Chabert d'Hières

Dans une époque optimiste et insouciante, dans une ville et une université en développement rapide, la contribution de Gabriel à la vie du laboratoire de mécanique des fluides s'est révélée essentielle, grâce à la fois à ses compétences scientifiques et à ses qualités humaines.

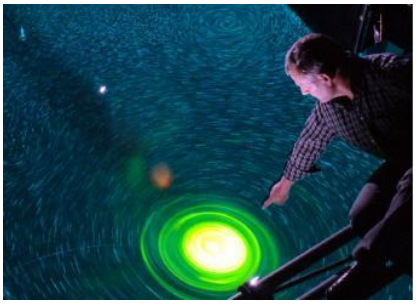
Henri Didelle (LEGI)

35 ans aux côtés de Gabriel Chabert d'Hières

J'ai croisé Gabriel Chabert d'Hières pour la 1ère fois en 1970. En 1976, j'intègre le Laboratoire Coriolis et il devient mon chef de service jusqu'à sa retraite en 1996. Par la suite je le solliciterai régulièrement pour venir suivre de nouvelles expériences susceptibles de l'intéresser. J'ai donc eu un peu de temps pour découvrir un certain nombre de facettes de sa personnalité.

Gabriel Chabert d'Hières était à la fois savant, humain, responsable, pédagogue, déterminé, un peu casse-cou, joueur même, bon camarade, enjoué mais aussi un tantinet imprévisible. J'avais pour habitude de ne jamais rejeter trop vite ses idées « farfelues » car certaines étaient quand même la solution audacieuse à un problème réputé insoluble. Il était Dauphinois, j'étais Savoyard, la ténacité était notre point commun et nous avons pourtant réussi à faire de grandes choses ensemble.

J'ai choisi une manière plutôt rigolote pour vous rapporter quelques anecdotes qui illustrent assez bien le personnage. Pour terminer, un extrait d'un film d'EDF de 1964 devrait rappeler quelques bons souvenirs à ceux qui l'ont bien connu. Pour les plus jeunes, ils doivent simplement admettre que c'était il y a 50 ans, sur la « Planète Coriolis ».



Peter Davies (University of Dundee, UK)

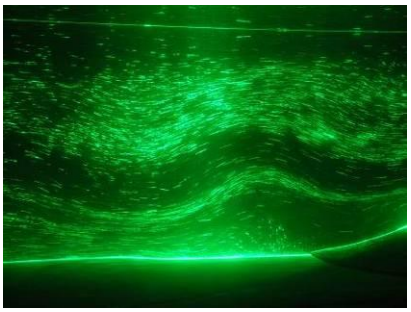
Obstacle wakes and boundary currents on the Coriolis platform

Several joint research investigations undertaken on the Coriolis platform (and elsewhere) with Gabriel Chabert d'Hières and his team since 1985 will be reviewed; these will include (i) the structure of wakes behind obstacles in rotating fluids (and the associated drag and lift forces), (ii) the behaviour of buoyancy-driven boundary currents trapped by topography and (iii) frontal instability.

Dieter Etling (Inst. für Meteorologie und Klimatologie, Leibniz Univ. Hannover, Allemagne)

Laboratory analogues of atmospheric motions

Atmospheric motions like vortices and waves are influenced by Earth rotation and stratification. The basic mechanism of these motions can be investigated by laboratory experiments with simplified configurations of the real atmosphere. As examples we present results for large scale cyclones which have been obtained in rotating tanks and on gravity waves investigated in stratified towing tanks.

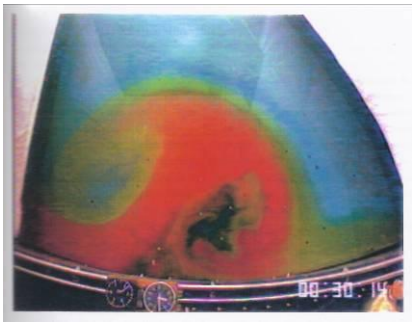


Tom Mc Climans (SINTEF, Trondheim, Norvège)

Some coastal current and convection studies

The coastal current along the Norwegian coast and the Algerian current off northern Africa show both cyclonic and anti-cyclonic eddies. The development of these depends on the upstream conditions and the underflow. Chabert d'Hieres showed that anticyclones/meanders form near the coast where there is a continuous supply of anti-cyclonic vorticity (see Fig.). Large anticyclones in the Norwegian Coastal Current cause difficulties for offshore operations. Using laboratory results, extreme currents have been predicted with available information of the upstream conditions.

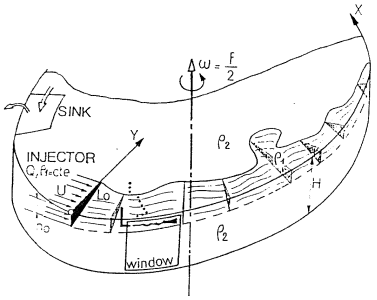
Cooling of surface water in the Barents Sea can cause dense water underflows in the canyons around banks. Encouraged by Gabriel Chabert d'Hieres, details of the convection process on shallow banks were studied at LEGI in collaboration with Tony Maxworthy (USC). The convection causes surface cyclones that are strong enough to induce cyclones in the outflowing dense water. In-situ measurements revealed that most of the transport to the mixing region occurs in thin Ekman layers.



M. Crépon, M. Jouini, K. Béranger, T. Arzouze, J. Beuvier, S. Thiria, L. Mortier (Lodyc, Paris)

Gabriel and the Mediterranean Sea: a new description of the Sicily strait circulation

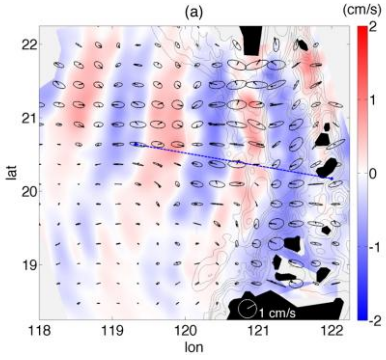
Gabriel was interested in the processes driving the circulation in the Mediterranean Sea, involving convection in the Gulf of Lions, instabilities of the Algerian current (with D. O'Baton and C. Millot), and the functioning of the Gibraltar strait (with Ph. Glezon). This helps now to understand recent results on the Sicily Strait . By using a neural network clustering method, the surface circulation is decomposed into height modes showing strong seasonal variations of the major currents, as well as a decenal variability. The topography of the Sicily Channel sill plays a major role for triggering the circulation. A combination of barotropic/baroclinic double Kelvin waves forced by density gradient on both side of the sill provides a mechanism for explaining the presence of the several currents advecting the Western Mediterranean waters into the Eastern Mediterranean.



Louis Gostiaux (LMFA, Lyon)

Internal waves, tides and solitons

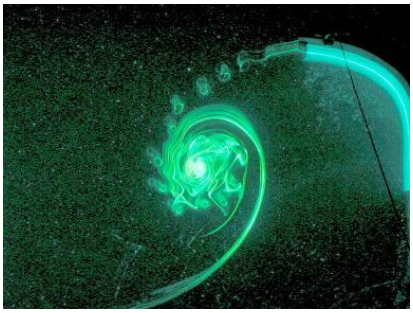
In a rotating stratified fluid, buoyancy force and the Coriolis effect are two restoring forces, that allow the propagation of waves. These so-called "internal waves" , present in the ocean and in the atmosphere, carry energy and momentum along latitude and longitude, but also in the vertical direction. The intrinsic three-dimensionality of these waves has made their study, in the field or in the lab, more difficult than for surface waves. Also, from a theoretical point of view, the dispersion relation of these waves is very peculiar. The Coriolis Platform has hosted many experiments on these waves, and was not only a unique facility for the study of rotating flows, but also one of the largest basins in the world that could be filled with a stratified fluid. It is also here that an original internal-wave maker was designed, which is now used by many researcher in the world. The last experiment performed a the Coriolis platform was a physical model of the Luzon Strait, in which the stratification and its influence on the tide was taken into account: after 50 years, tides were still studied at the Coriolis Platform, but these are now *internal* tides...



Jan-Bert Flor (LEGI)

Cyclone motions and interactions.

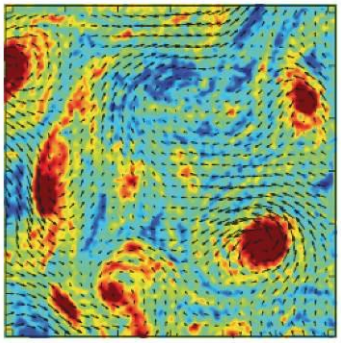
Two different studies on vortices will be presented, both conducted at the Coriolis platform thanks to the high Reynolds number that can be achieved. Motivated by the dynamics of the motion of tropical cyclones, monopolar vortices were considered on a topographic slope which mimics the effect of Earth curvature. The motion was studied as a function of the initial velocity profile inside the vortex. It was found that this initial velocity profile determines the speed and the direction of propagation of the vortex during some time. Subsequently the interaction between two cyclones in a stratified rotating fluid is considered experimentally. The question is whether there is a quasi-final equilibrium state in rotating stratified turbulence or whether it is perturbed by instability. The overall good agreement with the instability results suggest that the quasi-final equilibrium state consisting of two columnar vortices of opposed sign cannot be obtained.



Frederic Moisy (FAST)

Effect of rotation on turbulence

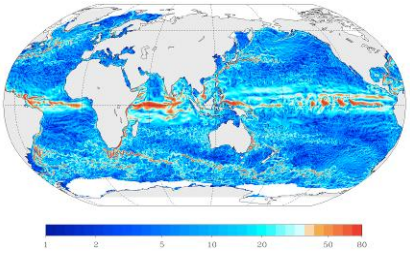
Turbulence in a rotating frame provides a remarkable system where two-dimensional and three-dimensional properties may coexist, with a possible tuning between direct and inverse cascades depending on the rotation rate and the geometry of the forcing. I will present here results from early experiments of decaying rotating turbulence performed on the Coriolis platform in 2005, and more recent experiments of forced turbulence performed on the small-scale rotating platform "Gyroflow" at University Paris-Sud.



Bernard Barnier (LEGI)

From tide studies to the modelling of global ocean and climate

Ocean science studies began in Grenoble in the 1960's, when a physical model of the English Channel was built on the Coriolis rotating table to study the feasibility of a huge tidal power plant in the Bay of Mont St Michel. A numerical tidal model was later developed which required 10 years of work before its accuracy could reach that of the physical model. But the possibility to rapidly transpose the numerical model to any place in global ocean motivated the scientists to continue pushing the numerical model forward. The evolution toward the modelling of the global ocean emerged from the link between tides and satellite altimetry. A global tidal model was developed and an unprecedented description of the ocean currents was achieved with altimetry measurements. This in turn motivated the Grenoble group to contribute to the development and use of general ocean circulation models for climate studies and operational forecast applications. In this context, the lecture will present recent model achievements regarding the modelling of the global ocean currents, and will tell how the future higher-resolution satellite altimetry missions are driving us back to Tides.



ABSTRACTS PROSPECTIVE (March 19th)

Henri Didelle (LEGI)

Gabriel Chabert d'Hières and Coriolis II.

Gabriel Chabert d'Hières est incontestablement le père fondateur de CORIOLIS I. Après 20 ans d'exploitation du modèle de la Manche, cette installation unique au monde est devenue subitement inutile après le désengagement d'EDF. Au milieu des années 80 Gabriel Chabert d'Hières a pourtant réussi à lui redonner une seconde vie ce qui lui a même permis d'accéder, en 1992, au statut de «Grand Instrument Européen».

Devant le succès de cette opération, cette installation est devenue subitement « trop petite », un peu à l'image de notre Planète. Gabriel Chabert d'Hières est alors la seule personne qui m'a expliqué qu'il fallait absolument construire une 2ème plateforme tournante sur le campus. Un jour où il était particulièrement en forme il a même imaginé d'en faire 2 !

Aujourd'hui il se trouve que les circonstances sont telles que son projet est devenu réalité. CORIOLIS II existe et il est en quelque sorte un clone de CORIOLIS I. Il a été très facile pour nous de reprendre ses idées de plus de 50 ans et de « séparer le bon grain de l'ivraie ».

Gabriel Chabert d'Hières était le père fondateur de CORIOLIS I, il est aujourd'hui le parrain de CORIOLIS II.

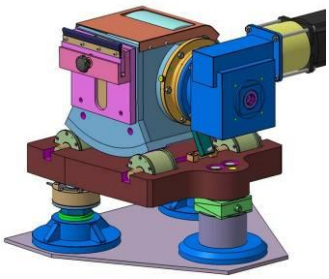
Jérôme Lacipière (Seras-Institut Néel, Grenoble)

Mechanical conception of the project Coriolis II

The new design reproduces the main features of the previous Coriolis platform, with the same tank size and the same basic principles, using a central conical ball bearing and a set of peripheral rolls to support part of the charge and maintain the rotation by a set of motors.

The instrumentation support frame built in 2005 is transferred to the new facility, but is now motorized to allow versatile positioning by rotation. It is also improved for safer accessibility. A full screening against wind effect is planned. Electric power up to 50 kW will be available on the platform and computer communication at 10 GHz through optical fiber provided, giving access to a computer cluster for intensive data storage and processing.

The quality of the supporting rail is improved allowing faster rotation velocity (period down top 10 s) with less vibrations. All the operations, rotation, water filling, and mechanical adjustment of the load, are controlled by computer. Optical access is improved through glass windows in the tank bottom and on the periphery, and a alcool tank will be used to produce density stratification with uniform optical index.



Samuel Viboud (LEGI)

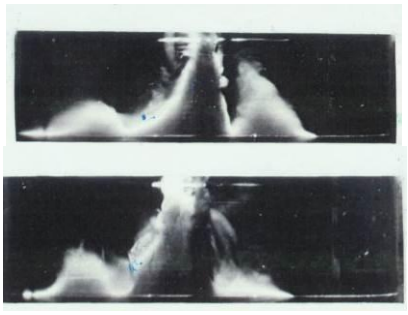
State of advancement of the project

The main stages of construction will be presented, from the foundations laid in January 2012 to the achievement scheduled for May 2014. A brief presentation of the companies involved and their role in the project will be done. Finally the centralized command system for the control of plateform rotation and for the activation of valves and pumps involved in the tank filling operations will be presented.

Joe Harindra Fernando *(*College of Engineering, Univ. Notre-Dame, Indiana)

From laboratory to climate: understanding multi-scale processes through Observations

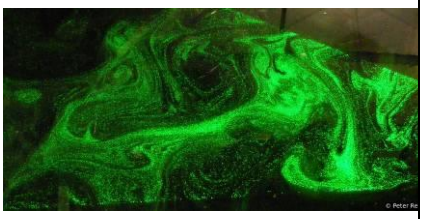
Our day-to-day activities are profoundly impacted by the local weather, which in turn is swayed by processes occurring over a multitude of scales, some even longer than our lifetimes and others spanning over the entire Earth in spatial scales. Nevertheless, currently we do not have sufficiently long observations or perfectly reliable models to predict physical mechanisms that parse such a vast swath of scales. Over the past seven decades, laboratory experiments conducted on rotating platforms have provided deep insights into flows from climate down to microscales, and they continue to provide useful guidance for understanding of model-rich and data-starved global scales. This presentation will highlight some of such efforts.



Peter Read *(*Univ. Oxford)

Experiments on convection and geostrophic turbulence

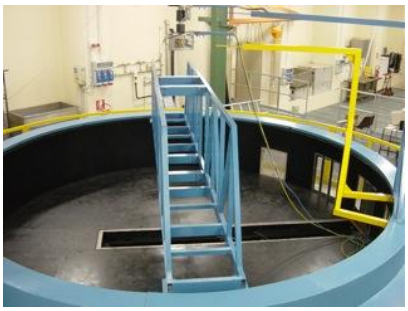
Geostrophic turbulence continues to be a key paradigm for understanding the dynamics and predictability of planetary atmospheres and oceans, though there are still many aspects, especially relating to the formation of eddy-driven zonal flows and other coherent structures, that are poorly understood. In particular, turbulent motions in rotating, stratified flows can be energized either through small-scale convection or larger-scale baroclinic instabilities, and may become highly anisotropic in the presence of beta-effects (planetary vorticity gradients). In some circumstances this may lead to the formation of multiple, parallel zonal jets and complex (and even non-local) inverse energy cascades. Accessing geophysically relevant parameter regimes (especially compared to the banded jet-like atmospheres of gas giant planets) in the laboratory is challenging, however, but recent work using the Coriolis platform (Mk I) has demonstrated that some useful insights into the excitation and nature of inverse energy cascades and jet formation from small-scale convection can be obtained if experiments are carried out on a large scale. This talk will review some of the key results from these experiments, and discuss what might become possible given the extended specifications of the Coriolis Platform II.



Enrico Ferrero **(**Università del Piemonte Orientale **)**

Simulation of atmospheric microbursts in rotating tank

In the past years we performed several experiments of atmospheric dynamics and turbulence at different scales, both in the Coriolis Laboratoire and in the TURLab (Torino). After a brief review of these experiments, recent simulations of atmospheric microbursts is presented. The physical model at a reduced scale of the atmospheric phenomenon is reproduced in the rotating tank of the TURLab. The similitude is based on the Froude number. Different experiments were carried out and the analysis of four significant cases is presented. The velocity, vorticity and turbulent kinetic energy fields are evaluated together with the swirling strength analysis. The comparison with the natural prototype is eventually shown and discussed. Past and present experiments demonstrated that rotating tanks are very useful facilities for the atmospheric sciences. Future collaborations between TURlab and Coriolis laboratories, also in the frame of European projects, taking into account the different scientific skills and facilities characteristics, can be prospected.



Chantal Staquet (LEGI)

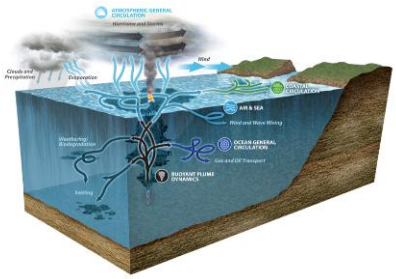
Modelling down-slope winds in Alpine valleys

The atmospheric boundary layer over complex terrain during stable winter conditions represents a major challenge from a fluid dynamics point of view, with strong issues about air quality, numerical weather predictions and climate change impact. The dynamics of the stable atmospheric boundary layer are controlled by down-slope winds which are triggered by the radiative cooling of the ground at sunset. The effect of these winds on the atmospheric boundary layer occurs through transport and mixing, which have to be parameterized in numerical weather predictions models. The development of a new parameterization or the tuning of existing parameterizations requires well-controlled laboratory experiments against which the validity of these simple models can be estimated. The Coriolis platform will thus host the first large-scale laboratory experiments of down-slope winds for a range of parameters with values close to those in the field. Similar gravity current experiments will also be performed to assess whether the latter flow can be used as a surrogate for down-slope winds.

Tamay Ozgokmen (Div. Meteorology and Phys. Oceanography, Rosenstiel School of Marine and Atmospheric Science, Miami, Florida)

Upper ocean processes: overview by the Consortium for Advanced Research on Transport of Hydrocarbon in the Environment (CARTHE)

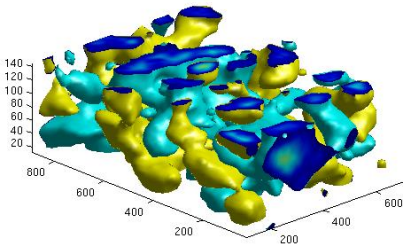
Research activities of the Consortium for Advanced Research on Transport of Hydrocarbon in the Environment (CARTHE) will be summarized. CARTHE is a 14-institution consortium conducting physical observational and modeling studies in the Gulf of Mexico (GoM) in the aftermath of the 2010 Deepwater Horizon oil spill. The primary objective of CARTHE is to develop a better understanding and modeling capabilities of turbulent dispersion ranging from microscales at the well head to mesoscales in the GoM, including multi-phase flows due to the presence of gas and oil, as well as the air-sea interaction. This talk will cover the two large experiments conducted by CARTHE in the GoM, namely the Grand LAgrangian Deployment (GLAD) near the DwH site and Surfzone and Coastal Oil Pathways Experiment (SCOPE), and accompanying modeling efforts.Possible collaborative experiments in the Coriolis tank will be suggested.



Olivier Eiff *(IMFT Toulouse)*

Decaying stratified turbulence in the laboratory

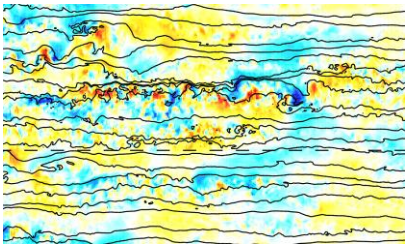
Velocity measurements of decaying grid-generated turbulence were carried out in large stably-stratified hydraulics tanks using classical 2D PIV and a full 3D-3C PIV method. The creation of large-scale stable iso optical-index stratifications enabled the optical measurements to be performed during the initial phases of the decay with the objective to capture and characterize the strongly stratified regime as well as the evolution across all regimes up to the viscously affected turbulence when the motion is quasi 2D.



Pierre Augier (DAMTP, Univ. of Cambridge)

Perspectives in rotating stratified turbulence

It is now known that when the rotation is moderate or weak, the departure from quasi-geostrophy can lead to leaks of energy from the large-scale nearly equilibrated flows. The energy then flows through the medium scales by an anisotropic cascade strongly influenced by the stratification. It then continues its route till the dissipation scales by overturning events and bursts of isotropic turbulence. These processes could explain many geophysical measurements but the involved mechanisms are still poorly understood. Moreover, in most previous experiments of strongly stratified flows, the dissipation at the large horizontal scales due to the vertical gradients inhibits the downscale energy cascade. Thus, the study of these issues in a laboratory experiment is a real challenge. We will present how we plan to overcome the associated difficulties by using the new Coriolis Platform.

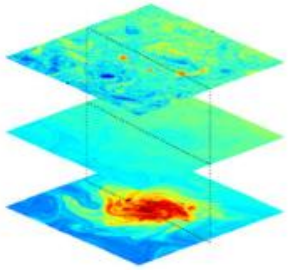


Antoine Venaille (ENS Lyon)

Vertical structure of geostrophic turbulence

Mesoscale oceanic turbulence (from 30km to 300km) is mostly forced at the surface, and yet a substantial

part of the energy is dissipated at the bottom of the oceans. Using statistical mechanics arguments, we propose a mechanism for energy transfers from the top to the bottom through potential vorticity stirring. This allows to address the role of large scale planetary vorticity gradients, topography and bottom friction. We test our predictions against numerical simulations, and discuss possible experiments on the new Coriolis turntable.



Geoffroy Lesur (IPAG, Grenoble**)**

Instabilities and transport in proto-planetary discs

Proto-planetary discs are gaseous rotating structures found around young stars. They are made of cold and weakly ionised gas, which is slowly accreted by the central star. To explain this accretion, it is believed that discs are turbulence. However, the mechanism driving this turbulence has remained elusive for decades. In this talk, I will review some of the instabilities proposed to explain the origin of turbulence in these objects. In particular, I will discuss two hydrodynamic instabilities which could be studied experimentally thanks to the new Coriolis platform.

Damien Sous (MIO**,** Univ. Toulon)

Sediment transport, bedforms and roughness effects

Sand ripples, submarine dunes, rocks, corals, shellfish colonies and vegetated substrates: the idealized case of a flat smooth surface is not everywhere satisfied on the ocean's floor. This talk will first briefly recall the basics of sediment transport and bed morphodynamics and then present a rapid overview of field and laboratory observations of roughness effects and the related attempts to parametrize friction processes. Finally, we will discuss the potential of laboratory experiments on large-scale turntable to bring useful insight to these open questions, including the presentation of preliminary experiments performed on the first Coriolis platform and prospects for future works on the new platform.

Eric Barthelemy (LEGI)

Nearshore morphodynamics and grain size sorting

In nearshore morphodynamics processes interlaces with a large range of scales. At the scale of grains and the wave boundary layer experiments reveal intense motion of water-sediment mixtures in the very bottom layer. At the scale of the surf zone LEGI flume experiments have shown that the shape and the cross shore evolution of beaches strongly depend on the nonlinear characteristics of the waves. At the same scale but in a 2D situation recent wave basin experiments (in ARTELIA facilities) have given a first insight on the vortical organization and the feed-back on the morphology. Finally we will discuss how the Coriolis turntable can be a new tool to investigate grain sorting processes and more specifically what is known as sorted bed forms.