

**Spontaneous Imbalance Workshop #1:
Perspectives from atmospheric and oceanic dynamics
August 7-10, 2006
University of Washington**

Agenda

Monday, August 7

- 8:00-9:00 Registration / continental breakfast
- 9:00-9:20 Opening remarks, *Tim Dunkerton/Pascale Lelong*

Morning: Fundamentals

Chairperson: Jeroen Molemaker

- 9:20-10:10 Spontaneous imbalance from James Lighthill onward
Michael McIntyre
- 10:10-10:30 Spontaneous inertia-gravity wave radiation from vortices: New theoretical
insights with possible relevance to hurricanes
David Schecter
- 10:30-10:50 *Break*
- 10:50-11:40 Exponential smallness of spontaneous inertia-gravity wave generation
Jacques Vanneste
- 11:40-12:00 Inertia-gravity wave radiation by a sheared three-dimensional vortex
Elinborg Olafsdottir
- 12:00-12:20 Exponential order approximation to the primitive equations
Djoko Wirosoetisno
- 12:20-1:30 *Lunch*

Afternoon: Turbulence/Cascades

Chairperson: Richard Scott

- 1:30-2:20 Balanced and unbalanced motions and their interactions at small and large
Rossby numbers
Vladimir Zeitlin
- 2:20-2:40 The dynamics of balanced motions at high Rossby numbers
Jim Riley

- 2:40-3:00 Interactions between vortical and high-frequency modes in Boussinesq turbulence
Peter Bartello
- 3:00-3:10 Poster presentations (2 minutes per poster)
- 3:10-3:30 *Break*
- 3:30-3:50 The transition from quasi-geostrophic to stratified turbulence
Michael Waite
- 3:50-4:10 The horizontal energy spectra and cascade processes in rotating stratified turbulence
Yuji Kitamura
- 4:10-4:30 Dissipation of synoptic scale flow by small-scale turbulence
Keith Ngan
- 4:30-4:50 Three-dimensionalization of 2D turbulence: aspect ratio effects
David Straub
- 5:30 ***Reception in Ocean Sciences Building with GFD laboratory demonstrations***
(hosted by Peter Rhines)

Tuesday, August 8

Morning: Atmosphere/Ocean Observations

Chairperson: Volkmar Wirth

- 9:00-9:50 Observations of gravity waves in the stratosphere and their sources in the troposphere
M. Joan Alexander
- 9:50-10:10 Gravity wave generation around the polar vortex in the stratosphere:
Kaoru Sato
- 10:10-10:30 Parameterization of stratospheric gravity waves forced by poleward breaking Rossby waves
Christoph Zuelicke
- 10:30-10:50 *Break*
- 10:50-11:10 Small-scale variability from the upper troposphere to the stratosphere: an overview of multi-year satellite observations from MLS, GPS, AIRS and AMSU
Dong Wu

11:10-12:00 Internal wave energy pathways in the ocean: Observations and speculations
Matthew Alford

12:00-1:30 *Lunch*

Afternoon: Ocean Observations/Laboratory Experiments

Chairperson: Bruce Sutherland

1:30-2:10 Observations of geostrophic adjustment signals in the Gulf Stream region
south of New England
Jae-Hun Park

2:10-2:30 Asymmetry and imbalance in a quasi-geostrophic parameter regime:
Kurt Polzin

2:30-2:50 *Break*

2:50-3:10 Emission of inertial and Rossby waves by vortices on a polar-beta plane:
laboratory experiments
Iakov Afanasyev

3:10-4:00 Spontaneous inertia-gravity wave generation by fully developed baroclinic
instability in the laboratory
Peter Read

4:00-4:20 Observations and consequences of spontaneously emitted inertia-gravity
waves from quasi-balanced flow
Paul Williams

6:30 **Dinner Reception:** *Pacific Northwest Buffet*
Waterfront Activities Center

Wednesday, August 9

Morning: Numerical Simulations

Chairperson: Kaoru Sato

- 9:00-9:50 Spontaneous balance adjustment and gravity wave excitation in baroclinic lifecycles
Fuqing Zhang
- 9:50-10:10 Inertia-gravity waves generated within a vortex dipole
Chris Snyder
- 10:10-10:30 Ray tracing of gravity waves in vortex dipoles
Shuguang Wang
- 10:30-11:00 *Break*
- 11:00-11:20 Spontaneous gravity wave radiation from unsteady rotational flows in the shallow-water system on an f-plane and a rotating sphere
Norihiko Sugimoto
- 11:20-11:40 Balanced and wave interactions in rotating shallow-water
David Muraki
- 11:40-12:00 Different flow regions exciting inertia-gravity waves in idealized baroclinic lifecycles
Riwal Plougonven (presented by Chris Snyder)
- 12:00-1:30 *Lunch*

Afternoon: Numerical simulations, cont'd

Chairperson: Peter Bartello

- 1:30-2:20 Quantifying the impact of gravity waves on vortical motions:
David Dritschel
- 2:20-2:40 The Kelvin-Helmholtz instability of a PV layer in an external shear: a spontaneous transition from balanced to unbalanced flow:
Gavin Esler
- 2:40-3:00 Balance and imbalance in nonhydrostatic rotating stratified turbulence:
William McKiver

- 3:00-3:30 *Break*
- 3:30-3:50 Imbalance and energy cascades
Jeroen Molemaker
- 3:50-4:10 Balance and gravity waves in spherical shallow-water turbulence:
Jemma Shipton
- 4:10-4:30 Source regions of IGWs on unstable large-scale flows
Pascale Lelong

Thursday, August 10

Morning: Applications

Chairperson: David Muraki

- 9:00-9:50 Balance and imbalance defined by state estimation
Greg Hakim
- 9:50-10:10 The effect of gravity waves in 4DDA
Lisa Neef
- 10:10-10:30 Modified Lagrangian-mean diagnostic applied to the polar vortex evolution
Yoshihiro Tomikawa
- 10:30-11:00 *Break*
- 11:00-11:20 Wave momentum transport diagnostics
Bruce Sutherland
- 11:20-11:40 An equatorial jet emerged in shallow-water turbulence on a rotating sphere
Yuji Kitamura
- 11:40-1:00 *Lunch*

Afternoon: Wrap-up

- 1:00-2:30 Plenary session
- 2:30 **Meeting adjourns**

