



2022 Gravity Wave Symposium

SPARC GW Symposium 2022 –Frankfurt am Main

28 March – 1 April 2022

Agenda



Monday 28 March

CEST (Central European Summer Time) = UTC+2

08:00 - 09:00 Check-In

Introduction / Orographic GW: Observations and Parameterization

09:00 - 09:15 Introduction

09:15 - 09:45 Sonja Gisinger¹: Gravity wave dynamics in the hotspot region of the Southern Andes and the Antarctic Peninsula during the SOUTHTRAC-GW field campaign in Winter/Spring 2019

09:45 - 10:00 Natalie Kaifler: Middle atmosphere momentum fluxes due to multi-scale mountain waves as observed by an airborne lidar over the southern Andes

10:00 - 10:15 Carsten Eden: A Closure for Lee Wave Drag on the Large-Scale Ocean Circulation

10:15 - 10:30 Francois Lott: Mountain waves produced by a stratified shear flow with a boundary layer

10:30 - 11:00 Break

Orographic GW: Parameterization and Simulation

11:00 - 11:15 Annelize van Niekerk: Orographic gravity wave drag parametrization: accounting for multi-scale orography

11:15 - 11:30 Catrin I. Meyer: Evaluation of explicitly resolved orographic gravity waves in ICON simulations with AIRS satellite observations

11:30 - 12:00 Christopher Kruse: Observed and Modeled Mountain Waves from the Surface to the Mesosphere Near the Drake Passage

12:00 - 13:30 Lunch

Non-Orographic GW: Simulations and Observations

13:30 - 14:00 Inna Polichtchouk: Resolved gravity waves in the stratosphere: Impact of increasing horizontal resolution from O(10 km) to O(1 km)

14:00 - 14:15 Wolfgang Woiwode: Non-orographic gravity waves and turbulence near the subtropical jet above the South Atlantic: SouthTRAC flight on 16 September 2019

14:15 - 14:30 Paola Rodriguez Imazio: Clear Air Turbulence observed across a tropopause fold over the Drake Passage: A Case Study

Poster Session

14:30	-	16:00	Poster / Coffee
			<i>Eframir Franco-Diaz</i> : Gravity wave activity at 54 and 69 N observed by Lidar and AIRS satellite measurements
			<i>Albert Hertzog</i> : Strateole-2: long-duration balloon observations of gravity waves in the tropical lower stratosphere
			<i>Emily Lear</i> : Comparing Gravity Waves in a Kilometre-scale Run of the IFS to AIRS Satellite Observations
			<i>Ruth Lieberman</i> : The NASA Atmospheric Waves Experiment (AWE)
			<i>Facundo Poblet</i> : Horizontal correlation functions of wind fields in the MLT: Results from a Helmholtz decomposition.
			<i>Aurélien Podglajen</i> ¹ : Assessment of inertia-gravity waves in ECMWF model forecasts and analyses using long-duration balloon observations
			<i>Zuzana Procházková</i> : Internal gravity wave detection in high-resolution model data
			Mierk Schwabe: Machine learning based gravity wave parameterizations for ICON

Non-Orographic GW: Secondary GW

16:00	-	16:30	Sharon Vadas: Gravity waves in the mesosphere and thermosphere from the polar vortex via multi-step vertical coupling
16:30	-	16:45	Mozhgan Amiramjadi ¹ : Secondary Gravity Waves in the Mesosphere and lower thermosphere (MLT) in idealize simulations with the Upper-Atmosphere ICON model
16:45	-	17:00	Irina Strelnikova ¹ : Decomposition of lidar observations into nearly monochromatic waves.
17:00	-	17:30	Neil Hindley: Atmospheric gravity waves from near the surface to the edge of space: new satellite observations, radar, numerical modelling and analyses
17:30		18:00	Break

Non-Orographic GW: GW Sources

18:00	-	18:15	Yue Wu: Gravity wave emission from a lee-wave critical layer
18:15	-	18:30	Jie Gong: Solar Eclipse Impact on Gravity Wave Generation and Propagation in the Lower Atmosphere
18:30	-	18:45	Jia Yue: La Soufriere Volcanic Eruptions Launched Gravity Waves into Space
18:45	-	19:00	Corwin Wright: The 2022 Hunga Tonga Volcanic Eruption: Globally-Propagating Waves Observed from Surface to Ionosphere
19:00			Ice Breaker

Tuesday 29 March

Non-Orographic GW: Convective GW / UTLS

- 09:00 - 09:30 Min-Jee Kang: Role of convective gravity wave drag in the quasi-biennial oscillation disruption
- 09:30 - 09:45 Junhong Wei¹: Global Distributions of Tropospheric and Stratospheric Gravity Wave Momentum Fluxes Resolved by the 9-km ECMWF Experiments
- 09:45 - 10:00 Yufang Tian: Statistical Characteristics and Possible Wave Sources of Inertia-gravity Waves in the Troposphere and Lower Stratosphere Observed by the Beijing MST radar
- 10:00 - 10:15 Michael Binder: Non-orographic GWs (NOGWs) excited by Propagating Tropopause Depressions - Idealized Numerical Simulations
- 10:15 - 10:30 Pramitha M: Meteor Radar Estimations of Gravity Wave Momentum Fluxes in the Mesosphere –Lower Thermosphere and their source spectra characterisation using Ray tracing modelling

Poster Session

- 10:30 - 12:00 Poster / Coffee
- Colby Brabec* : Estimates of Gravity Wave Momentum Fluxes at the Stratopause from AIM/CIPS Satellite Data
- Andreas Dörnbrack*¹: Stratospheric mountain waves trailing across Northern Europe
- Khalil Karami* : Assessing the impact of gravity waves on the stratospheric polar vortex by means of ICON model simulations
- Laura Köhler* : Comparing superpressure balloon gravity wave observations with high resolution models
- Haruka Okui*: Contribution of gravity waves to the universal vertical wavenumber spectra revealed by a gravity-wave permitting general circulation model
- Riwal Plougonven*: Comparison of orographic gravity waves in high-resolution simulations and in stratospheric balloon observations
- Gunter Stober*¹: Assessing the spatial variability of mesosphere/lower thermospheric horizontal and vertical winds from multi-static meteor radar networks applying tomographic retrievals with a 3DVAR+div algorithm
- Nedjeljka Žagar*: How uncertain are the equatorial Kelvin waves in state-of-the-art analyses: insights from the ESA Doppler wind lidar mission Aeolus
- 12:00 - 13:30 Lunch

Non-Orographic GW: Simulations / Observations / Parameterization / Decomposition

- 13:30 - 13:45 Andreas Dörnbrack¹: Stratospheric gravity waves excited by a propagating Rossby wave train - A DEEPWAVE Case Study
- 13:45 - 14:00 Milena Corcos: Observation of gravity waves at the tropical Tropopause using superpressure balloons
- 14:15 - 14:30 Gökce Tuba Masur: Balancing rotating shallow water flows in primitive variables
- 14:30 - 14:45 Christoph Zülicke¹: Wave capture and diffusion limitation of jet-generated gravity waves
- 14:45 - 15:00 Tyler Mixa¹: Evaluating the Impact of KHI Tube and Knot Dynamics as a Stratospheric Gravity Wave Source
- 15:15 - 15:30 Erich Becker¹: Gravity waves generated by the polar vortex in January 2016 over Europe

Poster Session

15:00	- 16:00	Poster / Coffee
		<i>Fabienne Schmid</i> ¹ : Towards a numerical laboratory for investigations of gravity-wave mean-flow interactions in the atmosphere
		<i>Ian Geraghty</i> : A Statistical Baseline of Gravity Waves Properties in the Mesosphere and Lower Thermosphere at McMurdo, Antarctica Derived From 10 Years of Lidar Observations
		<i>Dominika Hájková</i> : Parameterized orographic gravity wave drag in CMIP6 models, distribution, variability, trends and intermodel spread
		<i>Lars Hoffmann</i> : New AIRS and IASI high-resolution stratospheric temperature retrievals for gravity wave research
		<i>Stefanie Knobloch</i> ¹ : Interaction of tropospheric and stratospheric jets during the 2019 sudden stratospheric warming: Implications for the excitation and propagation of orographic gravity waves
		<i>Tracy Moffat-Griffin</i> : MesoS2D: mesospheric sub-seasonal to decadal predictability

Horizontal Propagation / Satellite Data /Lidar

16:00	- 16:30	Isabell Krisch ¹ : Gravity wave and PSC observations with ESA's Aeolus satellite
16:30	- 16:45	Sebastian Rhode ¹ : Quantification of oblique orographic gravity wave propagation deduced from a mountain wave model
16:45	- 17:00	Markus Geldenhuys ¹ : Gravity wave refraction: Cause and consequence
17:00	- 17:15	Lukas Krasauskas ¹ : Oblique propagation of mountain waves to the upwind side of the Andes observed by GLORIA and ALIMA during the SouthTRAC campaign
17:15	- 17:30	Robert Reichert ¹ : Estimates of momentum flux in the middle atmosphere using ground-based Rayleigh lidar temperature measurements and a linear Fourier ray model
17:30	18:00	Break

Laboratory Experiments

18:00	- 18:15	Joris Labarbe: Instabilities in stratified shear flows
18:15	- 18:30	Mark Schlutow ¹ : How to study atmospheric gravity waves in the laboratory with a gas centrifuge
18:30	- 19:00	Costanza Rodda ¹ : Gravity wave emission from jet systems in the differentially heated annulus experiment

Wednesday 30 March

GW Effects and Interaction: Turbulence and Clouds

09:00	-	09:30	Masashi Kohma: Estimation of turbulent energy dissipation rates in the mesosphere by a VHF radar in the Antarctic
09:30	-	09:45	Gerd Baumgarten: Noctilucent clouds “beautiful” tracers of mesoscale gravity waves and instabilities
09:45	-	10:00	Rakesh Teja Konduru: Explicit convection regional climate simulation of eastward propagating diurnal precipitation over south India: Role of gravity waves and mountain-plain-circulation
10:00	-	10:15	Stamen Dolaptchiev: Ice nucleation due to gravity waves
10:15	-	10:30	Robert Vicari: Understanding the distribution of convection wave signatures in water vapor sensitive satellite imagery
10:30	-	11:00	Break

GW Effects and Interaction: Planetary Waves / Global Simulation / Satellite

11:00	-	11:15	Aman Gupta: Coupled Planetary Wave-Gravity Wave Interactions in the Stratosphere as Revealed by ERA5
11:15	-	11:30	Ji-Hee Yoo: Compensation between planetary wave and orographic gravity wave forcing in the Northern Hemisphere winter stratosphere revealed in the CFSR reanalysis data
11:30	-	11:45	Andrea Schneidereit ¹ : Explicit global simulation of gravity waves for different vertical grid resolutions
11:45	-	12:00	Peter Preusse ¹ : The CAIRT Earth Explorer 11 mission: A way towards global GW momentum budgets
12:00	-	13:00	Lunch
13:00	-	16:00	Sightseeing

Spectral Distribution: Simulations and statistics

16:00	-	16:30	Claudia Christine Stephan ¹ : Atmospheric energy spectra in kilometer-scale global simulations
16:30	-	16:45	Nedjeljka Žagar: Kinetic energy spectra of vertical motions in the hydrostatic atmosphere: a unified framework for the derivation of vertical velocities of the Rossby and inertia-gravity waves
16:45	-	17:00	Yanmichel Morfa Avalos: The Relationship Between Horizontal and Vertical Velocity Wavenumber Spectra in Global Storm-resolving Simulations
17:00	-	17:30	Hossein Kafiabad: Statistics of gravity waves shaped by balanced atmospheric flows
17:30	-	17:45	Break

Spectral Distribution / Thermosphere Observations

17:45	-	18:00	Chihoko Cullens: Gravity Wave Observations from 90 to 250 km using ICON-MIGHTI instrument
18:00	-	18:15	Victor Avsarkisov: Investigation of mesoscale wind residuals in the MLT region over southern Patagonia
18:15	-	18:30	Priyanka Ghosh ¹ : Spectral characteristics of horizontal and vertical wind fluctuations in the troposphere and lower stratosphere over Andøya, Norway (69.30°N, 16.04°E) revealed by MAARSY
18:30	-	19:00	Hanli Liu: Spectral structures of gravity wave momentum and heat fluxes in the middle and upper atmosphere
19:00			Dinner

Thursday 31 March

GW Effects and Interaction: Planetary Waves / Circulation

09:00	-	09:30	Brentha Thurairajah: The Role of Gravity Waves in the Downward Progression of Stratospheric Temperature Anomalies during SSWs
09:30	-	09:45	Haruka Okui: Formation of a mesospheric inversion layer and the subsequent elevated stratopause associated with the major stratospheric sudden warming in 2018/19
09:45	-	10:00	Kaoru Sato: Roles of Rossby Waves, Rossby–Gravity Waves, and Gravity Waves Generated in the Middle Atmosphere for Interhemispheric Coupling
10:00	-	10:30	Petr Šácha: Interaction between parameterized orographic gravity wave drag and resolved dynamics in chemistry-climate models.
10:30	-	11:00	Break

GW Effects and Interaction / Transport / Breaking

11:00	-	11:15	Laura Holt: Effects of Vertical Mixing from Orographic Gravity Wave Breaking on Circulation and Chemical Transport in the Stratosphere
11:15	-	11:30	Maria Vittoria Guarino: Towards a novel gravity wave transport parametrization for the WACCM model
11:30	-	11:45	Robin Wing: Gravity wave breaking associated with Mesospheric Inversion Layers as measured by the ship-borne BEM Monge lidar and ICON-MIGHTI
11:45	-	12:00	Uwe Harlander ¹ : Two-dimensional internal gravity wave beam instability. Linear theory and subcritical instability
12:00	-	13:30	Lunch

GW Effects and Interaction: QBO and SAO

13:30	-	14:00	Young-Ha Kim ¹ : Representation of convective gravity waves and a QBO simulation using ICON/MS-GWaM
14:00	-	14:15	M Joan Alexander: Identification of fine-vertical-scale tropical wave modes in Strateole-2 balloon observations: Implications for QBO forces in the lowermost stratosphere
14:15	-	14:30	Manfred Ern ¹ : The semiannual oscillation (SAO) in the tropical middle atmosphere and its gravity wave driving in reanalyses and satellite observations
14:30	-	15:00	Martina Bramberger ¹ : First measurements of fine-vertical-scale wave impacts on the tropical lower stratosphere

Poster Session

15:00	-	16:15	Poster
<i>Timothy Banyard</i> : Atmospheric gravity waves in Aeolus wind lidar observations			
<i>Manfred Ern</i> ¹ : Intermittency of gravity wave potential energies and absolute momentum fluxes derived from infrared limb sounding satellite observations			
<i>Aleš Kuchař</i> : On the impact of the Himalayas on the polar vortex morphology			
<i>Ofer Shamir</i> : The gravity wave parameterization calibration problem: A 1D QBO model testbed			
<i>Shuang Xu</i> : A global view of stratopause gravity waves derived from CIPS RAA data			

16:15	-	17:30	Poster
<i>Jonathan Coney</i> : Deep learning techniques for gravity wave detection in NWP model output			
<i>Jackson Jandreau</i> : Analyzing lidar observations over McMurdo, Antarctica to investigate vertical development of gravity wave energy in the stratosphere and mesosphere			
<i>Constantino Listowski</i> : Infrasound propagation investigated using high-resolution global models resolving gravity waves in the stratosphere			
<i>Dana McGuffin</i> : Observation of Gravity Waves from Satellites Using Atmospheric Stellar Occultation			
<i>Valentino Neduhai</i> : Modal decomposition of the vertical momentum fluxes			

GW Effects and Interaction(Turbulence) / Parameterization

17:30	-	17:45	Thomas Ehrmann: Determining Stratospheric Turbulence Statistics from ER-2 Flight Data
17:45	-	18:00	Abhiram Doddi: Multi-Scale Dynamics of Kelvin-Helmholtz Instabilities Modulated by High-Frequency, Low-Amplitude Gravity Waves
18:00	-	18:15	Brenda Quinn: Application of the IDEMIX Concept for Internal Gravity Waves in the Atmosphere
18:15	-	18:30	Valery Yudin: Resolved and Parameterized Gravity Waves in Global Forecast System of NOAA
18:30	-	19:00	Aditi Sheshadri: A machine learning parameterization of gravity wave drag coupled to an atmospheric GCM

Friday 1 April

Parameterization

09:00	-	09:30	Shingo Watanabe: Application of Deep Learning to Estimate Atmospheric Gravity Wave Parameters in Reanalysis Data Sets
09:30	-	09:45	Lucia Yang: Neural network emulators for gravity wave parameterizations
09:45	-	10:00	David Connelly: Machine learning for gravity wave parameterization: regression tree ensemble approaches
10:00	-	10:15	Roland Eichinger: Horizontal redistribution of orographic gravity wave flux in a global climate model
10:15	-	10:30	Georg Sebastian Völker ¹ : Towards a transient gravity wave parametrization in atmospheric models
10:30	-	11:00	Break
11:00	-	13:00	Discussion
13:00			Lunch
15:00			Sightseeing
19:00			Dinner

Time slots: Invited talks: (25 + 5 min)
 Contributed talks: (12 + 3 min)

¹ (former) member of MS-GWaves, or strongly related