

Roy Barkan, Ph.D.

Faculty of Exact Sciences/ Department of Geophysics
 6 Nahal Saar, Even Yehuda 40500, Israel
 Tel. NO. 972-522-298228
 D.O.B: April 26th, 1980
 Place of birth: Israel
 ID number: 037492584
 updated February 22, 2021.

A. Education

- Tel Aviv University
B.S. - Geophysics and Biology.
2004 - 2007
- Scripps Institution of Oceanography, UCSD
M.S. - Oceanography.
2011
- Scripps Institution of Oceanography, UCSD
Ph.D.- Physical Oceanography. Thesis title: "From Forcing to Dissipation: Kinetic and Available Potential Energy Pathways in Idealize Models of Ocean Circulation". Advisors: Kraig B. Winters and Stefan G. Llewellyn-Smith.
2010 - 2015

B. Academic and Professional Experience

- Department of Atmospheric & Oceanic Sciences, UCLA.
Postdoc Employee - Studying oil dispersion in the Gulf of Mexico and the interaction between submesoscale currents and internal waves.
2015 - 2018
- Department of Atmospheric & Oceanic Sciences, UCLA.
Assistant Researcher in Physical Oceanography.
2018 - present
- Porter School of Environment and Earth Sciences, Tel Aviv University
Senior Lecturer in Physical Oceanography.
2018 - present

C. Active Participations in Scientific Meetings

- *Zvuloni, A., Artzy, Y., Stone, L., Kramarsky, E., Barkan, R., Kushmaro, A., Loya, Y.* The 11th International Coral Reef symposium: Spatio-Temporal Transmission Patterns of Black Band Disease in a Coral Community (poster presentation). Fort Lauderdale, Florida, 2008.
- *Barkan, R., ten Brink, U., and Lin, J.* American Geophysical Union, fall meeting: Trans-Atlantic tsunamis: Simulations of the 1755 Lisbon and of hypothetical Puerto Rico trench earthquake tsunamis (poster presentation). San Francisco, California, 2008.
- *ten Brink, U., Barkan, R., Andrews, B.D., and Chaytor, J.D.* American Geophysical Union, fall meeting: Inverse Power Law distribution and failure initiation of subaerial landslides, 2009.
- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* American Geophysical Union, Ocean Sciences meeting: Rotating Horizontal Convection (poster presentation). Salt Lake City, Utah, 2012.
- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* International Meeting of Students in Physical Oceanography: Rotating Horizontal Convection: Implications to the overturning circulation, thermocline and deep stratification in the oceans (oral presentation). La Jolla, California, 2012.
- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* Tel Aviv University Department of Geophysics and Planetary Sciences Invited Seminar: Rotating Horizontal Convection: Implications to the overturning circulation, thermocline and deep stratification in the oceans. Tel Aviv, Israel, 2012.

- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* Cal Tech Environmental Science and Engineering Invited Seminar: Rotating Horizontal Convection: Implications to the overturning circulation, thermocline and deep stratification in the oceans. Pasadena, California, 2013.
- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* Ocean Turbulence meeting: Rotating Horizontal Convection: Implications to the overturning circulation, thermocline and deep stratification of the oceans (poster presentation). Santa Fe, New Mexico, 2013.
- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* Ocean Sciences meeting: Energy Pathways and Loss of Balance in an Idealized Ocean Basin Forced by Wind Stress and Buoyancy Fluxes (poster presentation). Honolulu, Hawaii, 2014.
- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* UCLA Department of Atmospheric and Oceanic Sciences Invited Seminar: Energy Pathways and Loss of Balance in an Idealized Ocean Basin Forced by Wind Stress and Buoyancy Fluxes. Los Angeles, California, 2014.
- *Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G.* Weizmann Institute of Sciences Department of Earth and Planetary Sciences Invited Seminar: An Energetic Perspective of Ocean Circulation: The Role of the Submesoscales. Rehovot, Israel, 2015.
- *Barkan, R and J. C. McWilliams, and A. F. Shchepetkin, and M. J. Molemaker, and L. Renault, and A. Bracco, and J. Choi.* University of Miami, Rosenstiel School of Marine and Atmospheric Science, CARTHE meeting: Submesoscale Dynamics in the Northern Gulf of Mexico: Regional and Seasonal Characterization, and the Role of River Outflow. (Oral Presentation). Miami, Florida, 2015.
- *Barkan, R and K. B. Winters, and J. C. McWilliams.* Hebrew University Institute of Earth Sciences Invited Seminar: An Energetic Perspective of Ocean Circulation: The Role of Submesoscale Dynamics and Internal Waves. Jerusalem, Israel, 2015.
- *Barkan, R and K. B. Winters, and J. C. McWilliams.* Ocean Sciences meeting: The Enhancement of Eddy Kinetic Energy Dissipation by Internal Waves (poster presentation). New Orleans, Louisiana, 2016.
- *Barkan, R and K. B. Winters, and J. C. McWilliams.* Liège Colloquium meeting: Stimulated Imbalance and the Enhancement of Eddy Kinetic Energy Dissipation by Internal Waves (oral presentation). Liège, Belgium, 2016.
- *Barkan, R and K. B. Winters, and J. C. McWilliams.* Jet Propulsion Laboratory, Oceanography Division Invited Seminar: Stimulated Imbalance and the Enhancement of Eddy Kinetic Energy Dissipation by Internal Waves. Pasadena, California, 2016.
- *Barkan, R and J. C. McWilliams, and A. F. Shchepetkin, and M. J. Molemaker, and K. Srinivasan, and A. Bracco, and J. Choi.* University of Miami, Rosenstiel School of Marine and Atmospheric Science, CARTHE meeting: Submesoscale Dynamics in the Northern Gulf of Mexico: Frontogenetic Rates, Temperature-Salinity Compensation, and Cross Shelf Transport Processes (Oral Presentation). Miami, Florida, 2016.
- *Barkan, R and J. C. McWilliams, and A. F. Shchepetkin, and M. J. Molemaker, and K. Srinivasan, and A. Bracco, and J. Choi.* Gulf of Mexico Oil Spill & Ecosystem Conference: Submesoscale Dynamics in the Northern Gulf of Mexico: Frontogenetic Rates, Temperature-Salinity Compensation, and Cross Shelf Transport Processes (Oral Presentation). New Orleans, Louisiana, 2017
- *Barkan, R and J. C. McWilliams, and K. Srinivasan, and M. J. Molemaker.* Atmospheric and Oceanic Fluid Dynamics Conference: The Role of Horizontal Divergence in Submesoscale Frontogenesis (Oral Presentation). Portland, Oregon, 2017.

- *Barkan, R and K. B. Winters, and J. C. McWilliams.* Atmospheric and Oceanic Fluid Dynamics Conference: Stimulated Imbalance and the Enhancement of Eddy Kinetic Energy Dissipation by Internal Waves (Poster Presentation). Portland, Oregon, 2017.
- *Barkan, R and J. C. McWilliams, and K. Srinivasan, and M. J. Molemaker.* University of Miami, Rosenstiel School of Marine and Atmospheric Science, CARTHE meeting - The Role of Horizontal Divergence in Submesoscale Frontogenesis (Oral Presentation). Miami, Florida, 2017.
- *Barkan, R and J. C. McWilliams, and K. Srinivasan, and M. J. Molemaker.* Gulf of Mexico Oil Spill & Ecosystem Conference: The Dynamical Role of Horizontal Divergence in Submesoscale Frontogenesis (Oral Presentation). New Orleans, Louisiana, 2018.
- *Barkan, R and K. B. Winters, and J. C. McWilliams.* Workshop on internal wave eddy interactions: Stimulated Imbalance and the Enhancement of Eddy Kinetic Energy Dissipation by Internal Waves (Oral Presentation). Portland, Oregon, 2018.
- *Barkan, R and J. Gula, and J. C. McWilliams, and M. J. Molemaker.* Ocean Sciences meeting: How much of the ageostrophic energy in the ocean is associated with linear internal waves ? (Oral Presentation). Portland, Oregon, 2018.
- *Barkan, R and J. C. McWilliams, and A. Solodoch, and M. J. Molemaker.* University of Miami, Rosenstiel School of Marine and Atmospheric Science, CARTHE meeting: River plume dynamics during SPLASH (Oral Presentation). Miami, Florida, 2018.
- Barkan, R. University of Ben Gurion in the Negev. GFD-days meeting: Ageostrophic Turbulence and Ageostrophic Frontogenesis (Oral Presentation). Sde Boker, Israel, 2019.
- Barkan, R. University of Potsdam. Workshop on Conservation Principles, Data, and Uncertainty in Atmosphere-Ocean Modelling: Stimulated Imbalance and the Enhancement of Eddy Kinetic Energy by Internal Waves (Oral Presentation). Potsdam, Germany, 2019.
- Barkan, R and J. C. McWilliams, and K. Srinivasan, and M. J. Molemaker, and Eric A DAsaro. 2020 Ocean Sciences meeting: Submesoscale Frontogenesis (Oral Presentation). San Diego, USA, 2020.
- K. Srinivasan and Barkan, R and J. C. McWilliams, and J. Gula. 2020 Ocean Sciences meeting: Near-Inertial Wave-Eddy Interactions in Realistic High Resolution Simulations of the North Atlantic Subpolar Gyre (Oral Presentation). San Diego, USA, 2020.
- Siyanbola O. and Buisjman M. C, and Barkan, R, and B. K. Arbic. and J. C. McWilliams. 2020 Ocean Sciences meeting: The Effects of Remotely Generated Internal Tides in Regional Model Simulations of the California Current System (Poster Oresentation). San Diego, USA, 2020.
- Barkan, R. Hebrew University of Jerusalem invited seminar: What determines the distribution of contaminants in the ocean? Insights from observations, numerical modeling, and theory. Jerusalem, Israel, 2020.

E. Academic and Professional Awards

E.1.1 External Grants

- Office of Naval Research, USA - Near-Inertial Wave - Mesoscale - Submesoscale Interactions in the North Atlantic Supolar Gyre, 2018-2021. PI: Roy Barkan, total sum \$358,053
-
- Israeli Science Foundation, Israel - Interactions Between Internal Waves, Mesoscale Eddies, and Submesoscale Currents in Tropical and Extra Tropical Ocean Basins, 2018-2022. PI: Roy Barkan, total sum 1M NIS.

- National Science Foundation - The Interactions Between Internal Waves, Mesoscale Eddies, and Submesoscale Currents in the California Current System, 2019-2022. PI: Roy Barkan, co-PIs Prof. Brian Arbic (University of Michigan), and Prof. Maarten Buijsman (University of South Mississippi). Barkan's portion of the grant: \$370,854
- BIRD Foundation - U.S. - Israel Center of Excellence in Energy, Engineering and Water Technology, 2021-2023. PIs: Roy Barkan, Yaron Toledo (TAU), Hezi Gildor (HUJI). Barkan's portion of the grant: 214,308 NIS.

F. Doctoral Students Supervised by Candidate

2020 - present. Subhajit Kar. Physical Oceanography. In progress.

M.Sc. Students Supervised by Candidate

2019- present. Michal Shaham. Physical Oceanography. In progress.

Scientific Publications

A.1 Articles Published

1. Barkan, R. , ten Brink, U., and Lin, J. 2009. Far field tsunami simulations of the 1755 Lisbon earthquake: Implications for tsunami hazard to the U.S East Coast and the Caribbean. *J. Marine Geology*. **264**, 109-122. Q1, IF 2.364.
2. ten Brink, U., Barkan, R., Andrews, B.D., and Chaytor, J.D. 2009. Size distribution and failure initiation of submarine landslides and subaerial landslides. *Earth and Planetary Science Letters* **287**, 31-42. Q1, IF 4.409.
3. Zvuloni, A., Artzy, Y., Stone, L., Kramarsky, E., Barkan, R., Kushmaro, A., Loya, Y. 2009. Spatio-Temporal transmission patterns of Black-Band Disease in a coral community. *PLoS ONE* **4**, 1-10. Q1, IF 2.806.
4. Barkan, R., and ten Brink, U. 2010. Tsunami simulations of the 1867 Virgin Islands earthquake: Constraints on epicenter location and fault parameters. *Bulletin of Seismological Society of America* . **100**, 995-1009.
5. Winters, K. B. and Barkan, R. 2013. Available potential energy density for Boussinesq fluid flow. *J. Fluid Mech.* **714**, 476-488. Q1, IF 2.821.
6. Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G. 2013. Rotating Horizontal Convection. *J. Fluid Mech.* **723**, 556-586. Q1, IF 2.821.
7. Barkan, R., Winters, K.B. and Lewellyn-Smith, S.G. 2015. Energy Cascades and Loss of Balance in a Re-entrant Channel Forced by Wind Stress and Buoyancy Fluxes. *J. Phys. Oceanogr.* **45**, 272-293. Q1, 3.130.
8. Pratt, L., and R. Barkan, and I. Rypina. 2016. Scalar flux kinematics. *Fluids*. **1.3**: 27. Q1, IF 1.93.
9. Barkan, R., Winters, K.B. and McWilliams, J.C. 2017. Stimulated Imbalance and the Enhancement of Eddy Kinetic Energy Dissipation by Internal Waves. *J. Phys. Oceanogr.* **47**, 181-198. Q1, IF 3.130.
10. Choi. J., and A. Bracco, and R. Barkan, and J. C. McWilliams. 2017. Submesoscale Dynamics in the Northern Gulf of Mexico. Part III: Lagrangian Implications. *J. Phys. Oceanogr.* **47**, 2361-2376. Q1, IF 3.130.

11. Barkan, R and J. C. McWilliams, and A. F. Shechetkin, and M. J. Molemaker, and K. Srinivasan, and A. Bracco, and J. Choi . 2017. Submesoscale Dynamics in the Northern Gulf of Mexico. Part II: Temperature-Salinity Compensation, and Cross Shelf Transport Processes. *J. Phys. Oceanogr.* **47**, **2347-2360**. Q1, IF 3.130.
 12. Barkan, R and J. C. McWilliams, and A. F. Shechetkin, and M. J. Molemaker, and L. Renault, and A. Bracco, and J. Choi . 2017. Submesoscale Dynamics in the Northern Gulf of Mexico. Part I: Regional and Seasonal Characterization, and the Role of River Outflow. *J. Phys. Oceanogr.* **47**, **2325-2346**. Q1, IF 3.130.
-
13. DAsaro, Eric A., et al. 2018. Ocean convergence and the dispersion of flotsam. *Proceedings of the National Academy of Sciences.* **201718453**. Q1, IF 9.661
 14. Pearson, Jenna and B. Fox-Kemper, and R. Barkan, and J. Choi, and A. Bracco, and J. C. McWilliams. 2019. Impacts of convergence on Lagrangian statistics in the Gulf of Mexico. *J. Phys. Oceanogr.* **49**, **675-690**. Q1, IF 3.130.
 15. Srinivasan, K and J. C. McWilliams, and M. J. Molemaker, and R. Barkan. 2019. Submesoscale Vortical Wakes in the Lee of Topography. *J. Phys. Oceanogr.* **49**, **1949-1971**. Q1, IF 3.130.
 16. Barkan, R and J. C. McWilliams, and K. Srinivasan, and M. J. Molemaker. 2019. The Role of Horizontal Divergence in Submesoscale Frontogenesis. *J. Phys. Oceanogr.* **49**, **1593-1618**. Q1, IF 3.130.
 17. Sun D., and Bracco A. and Barkan, R., and Berta, M. and Dauhajre, D and Molemaker M. J., and Choi, J. and Guangpen. L, and Griffa., A. and McWilliams J.C. . 2020. Diurnal cycling of submesoscale dynamics: Lagrangian implications in drifter observations and model simulations of the northern gulf of mexico. *J. Phys. Oceanogr.* **50**, **1605-1623**. Q1, IF 3.130.
 18. Callies J., and Barkan, R, and Garabato A. N. 2020. Time Scales of Submesoscale Flow Inferred from a Mooring Array. *J. Phys. Oceanogr.* **50**, **1065-1086**. Q1, IF 3.130.

Articles Accepted

1. Wang, T., Barkan, R., McWilliams, J. C., and Molemaker, M. J. (2021). Structure of submesoscale fronts of the Mississippi River plume. *Journal of Physical Oceanography*.

Articles Under Review

1. Garabato A. N, Yu. X, Callies. J., Barkan. R., Polzin K. L. and Frajka-Williams E. E. (2021). Kinetic energy transfers between mesoscale and submesoscale motions. *Journal of Physical Oceanography*.