

# Shikhar Rai

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## Publications

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- [1] **Shikhar Rai**, J Thomas Farrar, Hussein Aluie. “Atmospheric wind energization of ocean weather”. *Nature Communications* 16.1 (2025), p. 1172. DOI: [10.1038/s41467-025-56310-1](https://doi.org/10.1038/s41467-025-56310-1).
- [2] Hussein Aluie, **Shikhar Rai**, Hao Yin, Aarne Lees, Dongxiao Zhao, Stephen M Griffies, Alis-tair Adcroft, Jessica K Shang. “Effective drift velocity from turbulent transport by vorticity”. *Physical Review Fluids* 7.10 (2022), p. 104601. DOI: [10.1103/PhysRevFluids.7.104601](https://doi.org/10.1103/PhysRevFluids.7.104601).
- [3] **Shikhar Rai**, Matthew Hecht, Matthew Maltrud, Hussein Aluie. “Scale of oceanic eddy killing by wind from global satellite observations”. *Science Advances* 7.28 (2021), eabf4920. DOI: [10.1126/sciadv.abf4920](https://doi.org/10.1126/sciadv.abf4920).
- [4] Krishna Khanal, Hari P Neopane, **Shikhar Rai**, Manoj Thapa, Subendu Bhatt, Rajendra Shrestha. “A methodology for designing Francis runner blade to find minimum sediment erosion using CFD”. *Renewable Energy* 87 (2016), pp. 307–316. DOI: [10.1016/j.renene.2015.10.023](https://doi.org/10.1016/j.renene.2015.10.023).

## Pre-Prints:

- [5] **Shikhar Rai**, Matthew W Hecht, Mathew E Maltrud, Hussein Aluie. “Scale-dependent air-sea mechanical coupling: resolution mismatch and spurious eddy-killing”. *Authorea Preprints* (2023). DOI: [10.22541/essoar.167525271.13326232/v1](https://doi.org/10.22541/essoar.167525271.13326232/v1).

## Conference Presentations

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### Invited Talks:

- [1] **Shikhar Rai**, Thomas J. Farrar, Hussein Aluie. “Atmospheric wind energization of ocean weather”. *Observing Air-Sea Interactions Strategy (OASIS) Webinar Series*. 2025.
- [2] **Shikhar Rai**, Matthew W. Hecht, Mathew E. Maltrud, Hussein Aluie. “Disproportionate Role of Small-Scale Winds On the Mesoscales and Spurious Eddy Killing from Resolution Mismatch”. *Ocean DYNAMICS and Surface Exchange with the Atmosphere, Winds and Currents Webinar*. 2023.

### Presentations:

- [3] **Shikhar Rai**, Matthew W. Hecht, Mathew E. Maltrud, Hussein Aluie. “Modeling of Air-Sea Momentum Flux at the Mesoscales: Resolution Mismatch and Spurious Eddy-Killing”. *Ocean Sciences Meeting, American Geophysical Union*. 2024.
- [4] **Shikhar Rai**, Matthew W. Hecht, Mathew E. Maltrud, Hussein Aluie. “Scale Analysis of Wind Work on the Oceanic General Circulation”. *Physical Oceanography Dissertation Symposium XIII, Lihue, Hawaii*. 2024.

- [5] Mehrnoush Kharghani, Benjamin Storer, **Shikhar Rai**, Hussein Aluie. “Mass Transport By Oceanic Mesoscale Eddies”. *American Physical Society, Division of Fluid Dynamics, Annual Meeting*. 2023.
- [6] Abdus Samad, Benjamin Storer, **Shikhar Rai**, Hussein Aluie. “Investigating mechanism underlying the North Atlantic Oscillation”. *American Physical Society, Division of Fluid Dynamics, Annual Meeting*. 2023.
- [7] Hussein Aluie, Michele Buzzicotti, Stephen Griffies, Matthew Hecht, Hemant Khatri, Matthew Maltrud, **Shikhar Rai**, Mahmoud Sadek, Benjamin Storer, Geoffrey Vallis. “Disentangling the Oceanic General Circulation”. *American Physical Society, Division of Fluid Dynamics, Annual Meeting*. 2022.
- [8] **Shikhar Rai**, Matthew Hecht, Matthew Maltrud, Hussein Aluie. “Oceanic Eddy-killing by Wind from Global Satellite Observations”. *Ocean Sciences Meeting, American Geophysical Union*. 2022.
- [9] **Shikhar Rai**, Matthew Hecht, Matthew Maltrud, Hussein Aluie. “Scale of Eddy Killing from Global Satellite Observations”. *FilaChange Surface Water and Ocean Topography, AdAC Consortium*. 2022.
- [10] **Shikhar Rai**, Hao Yin, Hussein Aluie, Aarne Lees, Dongxiao Zhao, Stephen Griffies, Jessica Shang. “Effective Drift Velocity from Turbulent Transport by Vorticity in Compressible Turbulence”. *American Physical Society, Division of Fluid Dynamics, Annual Meeting*. 2022.
- [11] Hussein Aluie, **Shikhar Rai**, Matthew Hecht, Matthew Maltrud. “Oceanic Eddy-killing by Wind from Global Satellite Observations”. *American Physical Society, Division of Fluid Dynamics, Annual Meeting*. 2021.

#### Posters:

- [12] **Shikhar Rai**, Susan Anne Wijffels, Hyodae Seo. “Data-driven approach in investigating the differences in wind measurement in the Tropical Pacific between buoys and QuikSCAT”. *Wyrski Symposium, Honolulu, Hawaii*. 2025.
- [13] **Shikhar Rai**, Susan Anne Wijffels, Hyodae Seo. “Data-driven approach in investigating the differences in wind measurement in the Tropical Pacific between buoys and QuikSCAT”. *American Geophysical Union, Annual Meeting*. 2024.
- [14] **Shikhar Rai**, Matthew W. Hecht, Mathew E. Maltrud, Hussein Aluie. “Wind-driven Ocean: Atmospheric Scales Forcing the Ocean Circulation and Damping its Eddies”. *American Geophysical Union, Fall Meeting*. 2022.
- [15] **Shikhar Rai**, Matthew Hecht, Mathew Maltrud, Hussein Aluie. “Oceanic Eddy-killing by Wind from Global Satellite Observations”. *American Geophysical Union, Fall Meeting*. 2021.
- [16] **Shikhar Rai**, Matthew W. Hecht, Mathew E. Maltrud, Hussein Aluie. “Wind Forcing and Eddy Killing in the Global Ocean”. *Ocean Sciences Meeting, American Geophysical Union*. 2020.
- [17] **Shikhar Rai**, Mahmoud M. Sadek, Mathew Maltrud, Matthew W. Hecht, Geoffrey K. Vallis, Hussein Aluie. “Direct and Indirect Wind Driving of the Ocean”. *22nd Conference on Atmospheric and Oceanic Fluid Dynamics, American Meteorological Society*. 2019.