

This submission contains processed datasets from ADV measurements at 6 tidal energy sites around the world analyzed in Vince et al. 2026. Note that the absence of raw ADV time series at Sound of Islay precluded computing streamwise integral length scale, and velocity power spectra.



Site map

The files are in netCDF format, and each file is named after the site name in the paper. The key plots, including tidal ellipse, velocity power spectra, and turbulence intensity versus mean resultant velocity, are included in the paper. The processed data for each site includes:

Variable	Description
lat	Latitude in degrees North
lon	Longitude in degrees East
θ_f	Principal flood direction
θ_e	Principal ebb direction
time	Hours since January 1, 2000
$\bar{u}$	Mean streamwise velocity
$\bar{v}$	Mean transverse velocity
$\bar{w}$	Mean vertical velocity
$\bar{U}$	Mean resultant velocity
σ_u	Standard deviation of streamwise fluctuation
σ_v	Standard deviation of transverse fluctuation
σ_w	Standard deviation of vertical fluctuation
σ	Total standard deviation of fluctuation
TKE	Turbulent kinetic energy
$upup$	Streamwise normal stress $\overline{(u'u')}$
$vpvp$	Transverse normal stress $\overline{(v'v')}$
$wpwp$	Vertical normal stress $\overline{(w'w')}$
$upwp$	Shear stress from streamwise-vertical turbulence interaction $\overline{(u'w')}$
α	Turbulence anisotropy
I_u	Streamwise turbulence intensity
I_v	Transverse turbulence intensity
I_w	Vertical turbulence intensity

I	Total turbulence intensity
P_u	Reynolds-averaged power density
L_u	Streamwise integral length scale
ϕ_u	Streamwise velocity power spectra from 5-minute ensembles at $\bar{u} = 1.5$ m/s
f	Frequency range for the velocity power spectra
$\sigma_{n,u}$	Doppler noise in streamwise component
$\sigma_{n,v}$	Doppler noise in transverse component
$\sigma_{n,w}$	Doppler noise in vertical component

Reference: Neary, V.S., Jang, M.C., Ruhl, C., Banerjee, A., Chamorro, L.P., Comparative turbulence characterization survey at reference high power density tidal energy sites, Journal XYZ in-review, submitted February 2026.

This submission fully complies with the FAIR (Findable, Accessible, Interoperable, and Reusable) data principles as follows:

Findable: The MHKDR is an open-access data repository maintained, promoted, and supported by DOE's portal and repository for information on marine renewable energy (PRIMRE). This network of knowledge hubs provides broad access to information on engineering and technologies, resource characterization, device performance, and the environmental effects of marine energy projects. The MHKDR is readily findable and accessible with a simple Google search. Once published, the datasets will have a digital object identifier (DOI).

Accessible: As a self-describing data format commonly used for storing multi-dimensional scientific data that can be accessed using open-source programming language like Python and R, netCDF files are accessible.

Interoperable: netCDF files can be easily imported into other applications and databases, ensuring their interoperability.

Reusable: These data files are well-documented and accompanied by sufficient information to facilitate their use in other contexts, making them reusable.