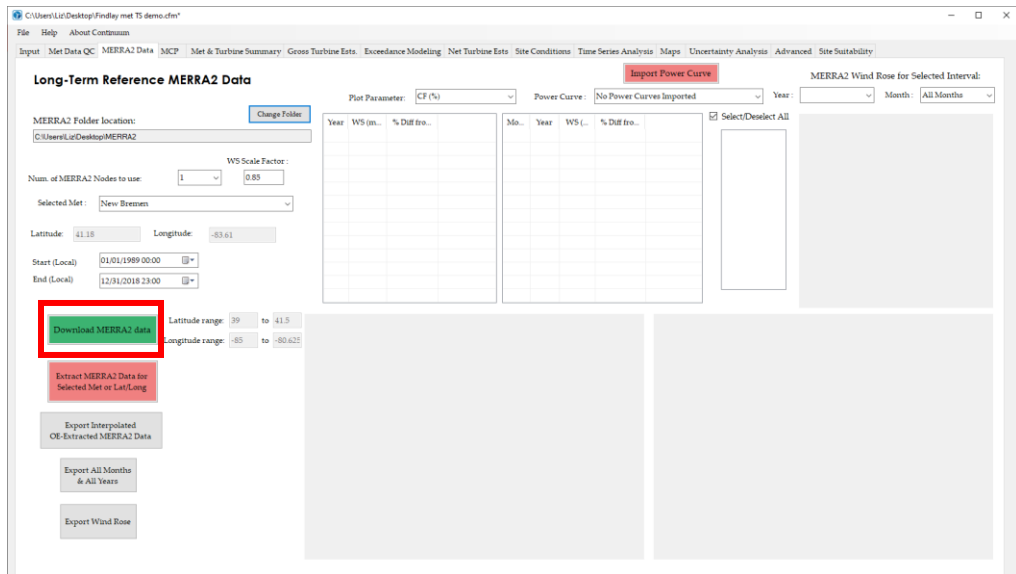


How to conduct MCP

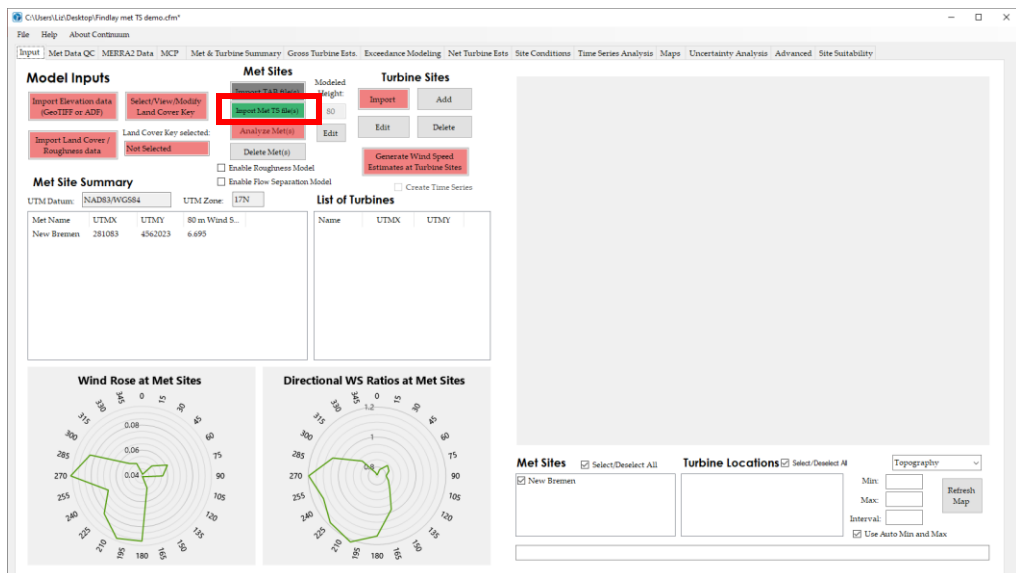
Tutorial Summary:

Learn how to conduct MCP (Measure-Correlate-Predict) using MERRA2 reanalysis 50 m data as the long-term reference and met time series data. Choose from four MCP methods and bin data by wind direction, time of day, and season.

- 1) Download MERRA2 data
 - See tutorial



- 2) Import met time series data
 - Link to tutorial



How to conduct MCP

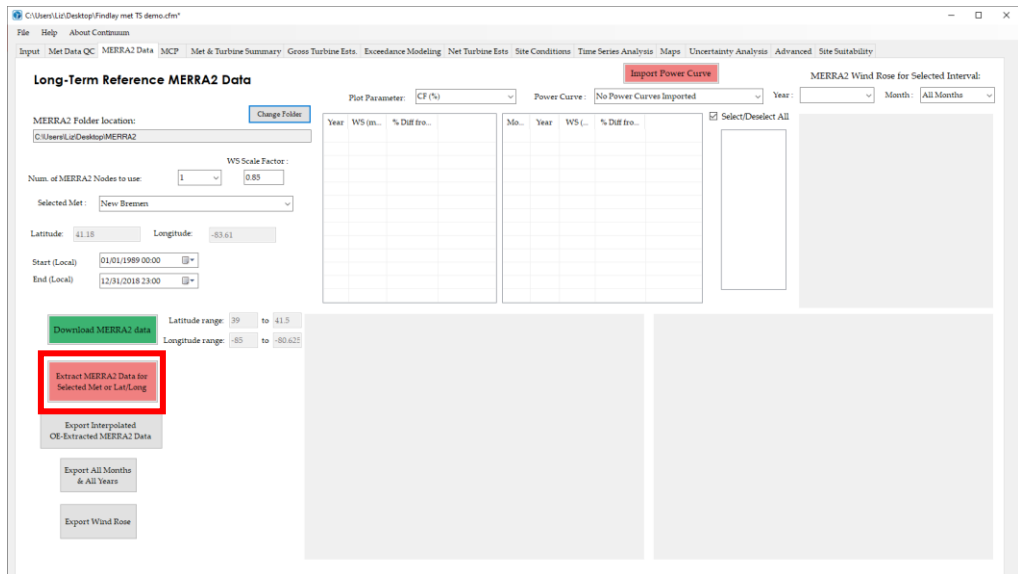
3) Select MCP settings

- Go to MCP tab
- Choose MCP Method:
 - Orthogonal Regression
 - Variance Ratio
 - Method of Bins
 - Matrix
- Number of WD (Wind Direction) bins: 4, 8, 12, 16, or 24
- Number of Time of Day bins: 1 or 2
 - If 2 bins selected,
 - Day: 7am to 6pm
 - Night: 7pm to 6am
- Number of Season bins: 1 or 4
 - If 4 bins selected,
 - Winter: Dec. – Feb.
 - Spring: Mar. – May
 - Summer: Jun. – Aug.
 - Fall: Sep. – Nov.
- Wind Speed (WS) bin width: 0.1 to 2 m/s
 - Used only in Method of Bins and Matrix methods
- WS Probability Density Function (PDF) Weight: 0 to 10
 - Used only in Matrix MCP method
- Last WS Weight: 0 to 10
 - Used only in Matrix MCP method

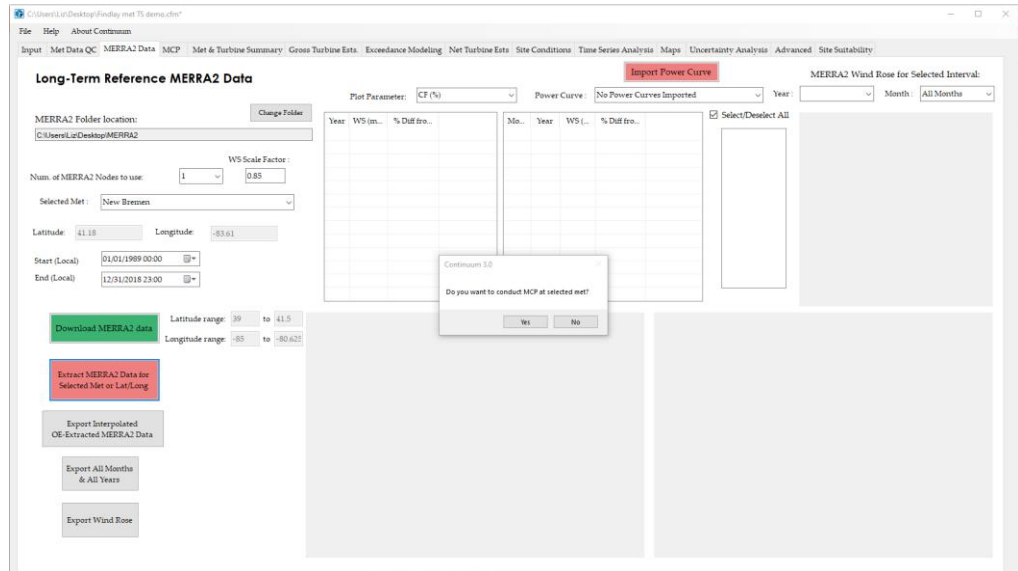
The screenshot displays the 'MCP Settings' window in the Continuum software. The 'MCP Method' is set to 'Orth. Regression'. The 'Method of Bins / Matrix Setting' section is highlighted with a red box, showing 'Num. WD bins' set to 16, 'Num. Time of Day bins' set to 2, and 'Num. Season bins' set to 4. The 'Matrix Settings' section shows 'WS PDF Weight' set to 1 and 'Last WS Weight' set to 1. The 'MCP Uncertainty Analysis' section shows 'Uncertainty Window Step (months)' set to 1. The 'MCP Summary' section shows 'Selected Site' as 'New Bremen' and 'Concurrent Data Range' as '02/03/20 16:33'. The 'MCP Regression Stats.' section shows 'Slope' and 'Intercept' fields. The 'Mean Concurrent and Long-term Wind Speeds' section shows 'Avg. Conc. WS (m/s)' and 'Avg. LT WS (m/s)' fields. The 'Avg & SD WS Ratios (T/R)' section shows a table with columns for 'WS', 'Mean', 'SD', and 'Count'. The 'Export Data Range' section shows 'Export WS Bin Ratios' and 'Export Estimated data as TAB File' buttons. The 'Export Uncertainty Analysis' button is also visible.

How to conduct MCP

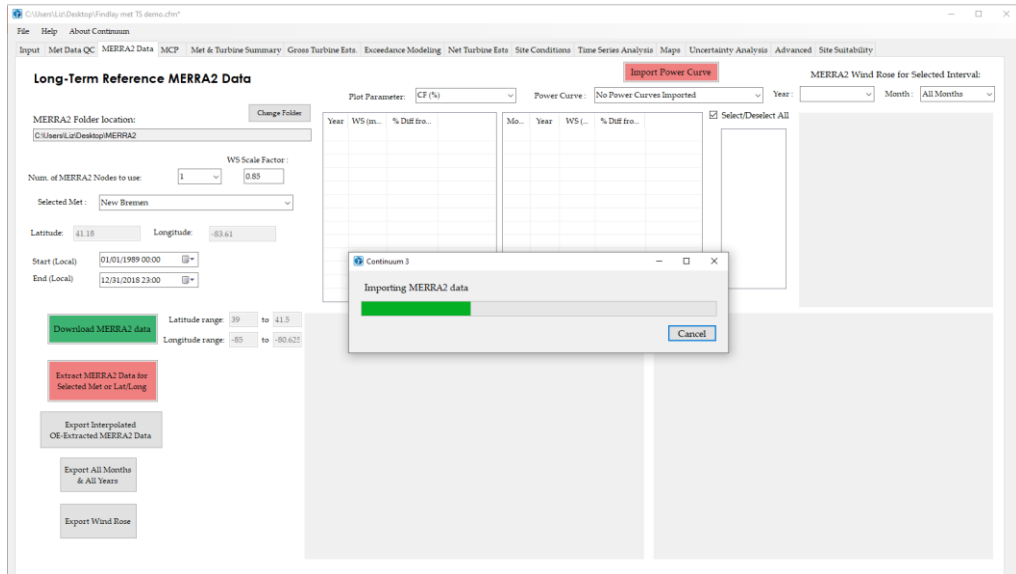
4) Extract MERRA2 data



- Click 'Yes' when asked 'Do you want to conduct MCP at selected met?'

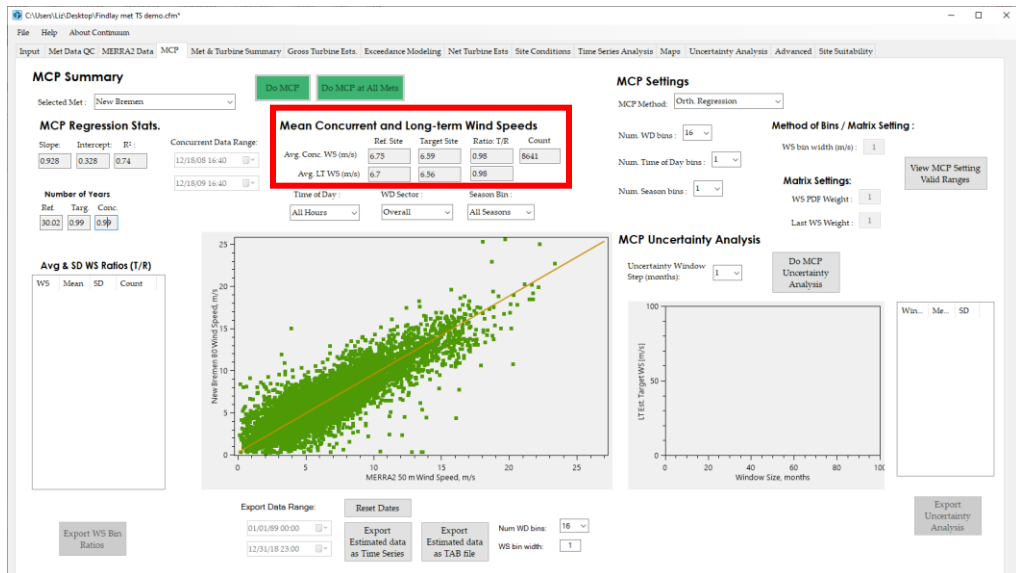


How to conduct MCP



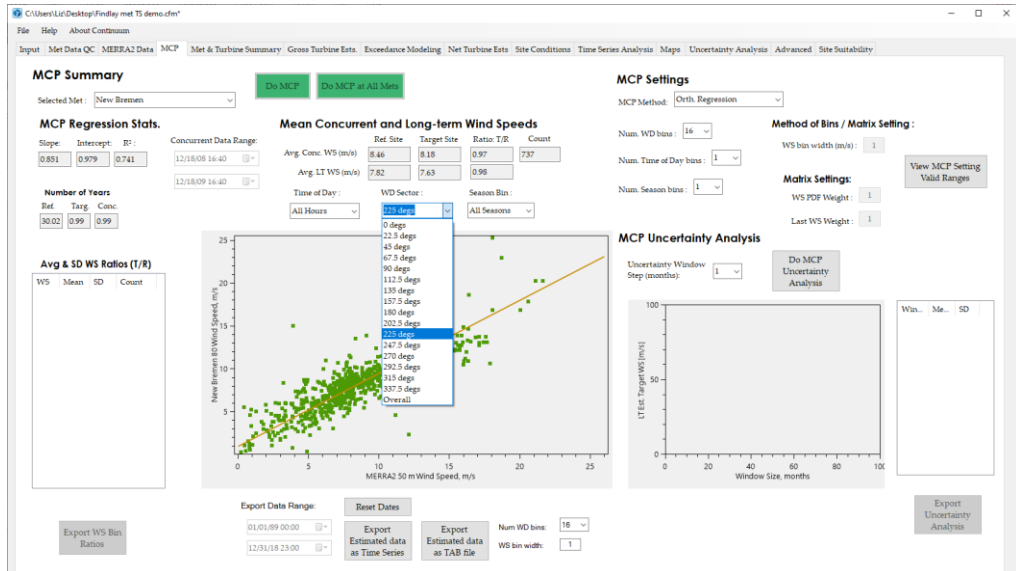
5) View results of MCP long-term estimates

- View mean concurrent and long-term wind speeds calculated at reference site (i.e. MERRA2) and target site (i.e. met site)



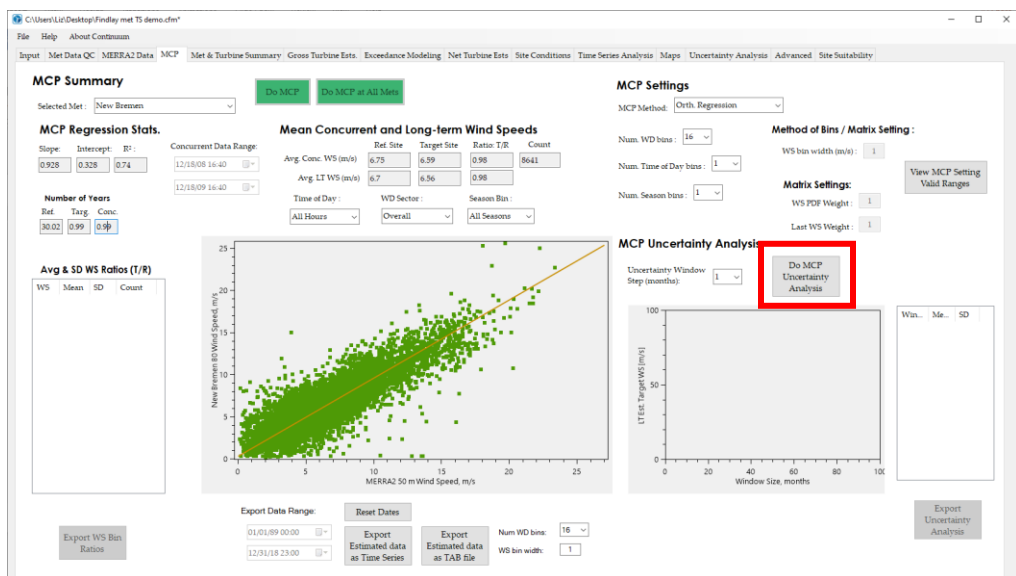
- Toggle between wind direction, time of day, and season dropdown menus to view MCP relationships in different bins

How to conduct MCP



6) Run MCP Uncertainty Analysis

- Specify uncertainty window step (in months). Default value is 1.
 - In the uncertainty analysis, MCP is conducted using window sizes ranging from one month to the maximum number of months contained in met data.
 - This setting defines the window stepsize used when defining the various window ranges.
 - For example, for a window size of 2 months, the first date range could be from 1/1/2015 to 2/28/2015.
 - If the window stepsize is 1 month, the next window range would be 2/1/2015 to 3/31/2015.
 - If the stepsize is 2 months, the next range would be 3/1/2015 to 4/30/2015.



How to conduct MCP

The screenshot displays the MCP software interface with the following sections:

- MCP Summary:** Includes a dropdown for 'Selected Met' (New Bremen) and buttons for 'Do MCP' and 'Do MCP at All Met's'.
- MCP Regression Stats:** Shows 'Slope' (0.851), 'Intercept' (0.979), and 'R²' (0.741). It also includes 'Concurrent Data Range' and 'Number of Years' (Ref: 30.02, Tang: 0.99, Conc: 0.99).
- Mean Concurrent and Long-term Wind Speeds:** A table with columns for 'Ref. Site', 'Target Site', 'Ratio T/R', and 'Count'. It lists 'Avg. Conc. WS (m/s)' (8.46 vs 8.18) and 'Avg. LT WS (m/s)' (7.82 vs 7.63).
- MCP Settings:** Includes 'MCP Method' (Orth. Regression), 'Num. WD bins' (16), 'Num. Time of Day bins' (1), 'Num. Season bins' (1), 'Method of Bins / Matrix Setting' (WS bin width (m/s): 1), 'Matrix Settings' (WS PDF Weight: 1, Last WS Weight: 1), and 'Do MCP Uncertainty Analysis'.
- MCP Uncertainty Analysis:** Shows 'Uncertainty Window Step (months)' (1) and a plot of 'LT Target WS (m/s)' vs 'Window Size, months'. A table to the right provides statistics for window sizes 1 through 12.
- Avg & SD WS Ratios (T/R):** A table with columns for 'WS', 'Mean', 'SD', and 'Count'.
- Export Data Range:** Includes 'Export WS Bin Ratios' and 'Export' buttons for 'Estimated data as Time Series' and 'Estimated data as TAB file'.

Win.	Me.	SD
1	6.63	0.26
2	6.56	0.15
3	6.56	0.1
4	6.56	0.07
5	6.57	0.06
6	6.57	0.05
7	6.57	0.05
8	6.56	0.05
9	6.56	0.04
10	6.56	0.01
11	6.56	0.01
12	6.56	0