New European Wind Atlas (NEWA) in windPRO:

From Turbulent Kinetic Energy (TKE) to Turbulence Intensity (TI)

This note outlines a manual step-by-step procedure with the use of Excel to convert TKE into TI when having a NEWA time series within a meteo-object. Turbulence intensities are sometimes used as input to wake calculations or site-compliance studies. Currently – October 2021 – windPRO does not support the use of TKE as a turbulence parameter. However, if the TKE is converted into the square root of the TKE, windPRO is able to convert the value into a turbulence intensity. Follow this step-by-step procedure in windPRO 3.4 or 3.5, then you have a meteo-object with turbulence intensities within 10-15 minutes.

In windPRO 3.4 or 3.5:

1. Download NEWA data in a meteo-object and open it
2. Go-to the '*Data*' tab and make sure that '100.00m -' is selected in the 'Heights' list to the right
3. Press the *'Add signal'* button and for the table and line added:
    a. Change the *'Required signal'* to *'User defined'*
    b. Change the *'Based on'* to *'TKE.100 (100.0m)'*
    c. Add '*TKE*' as the 'Signal name'
4. Press the green button '*(Re)load all files for selected height*'
5. Click the '*Export*' button and in the *'Time Series Export Form'*:
    a. Check that the *'Export all decimals'* is enabled
    b. Use 'File format': 'Local PC localization'
    c. Check that 'TKE' is included in the export (expand the tree to check)
    d. Click *'Copy to clipboard'*

In Excel (see also the figure below):

1. Open a new blank spreadsheet in MS-Excel, then paste the data from the clipboard
2. Go-to cell V33
3. Name the column: *StdDevWindspeedUID_100.0m|Std dev wind speed|L0.00*
   (do the naming in cell V33; this will enable the meteo-importer to auto-recognize the data-field)
4. Calculate the square-root of all TKE-values (column 'E') within the new column 'V'
   (example: =SQRT(E35), do this for all cells in column 'V')
5. Save the file with the format: *'Text (Tab delimited) (*.txt)*'.
   Name it 'NEWA_N57.5046_E10.52557.txt' or similar.
6. Close Excel

In windPRO 3.4 or 3.5:

1. Make a new meteo-object on top of the 'old' one (same geographical location)
2. Select *'GO time series'*
3. Press *'Add files'* and select the file that you saved above (e.g. 'NEWA_N57.5046_E10.52557.txt')
4. Press *'Auto detect,* and press 'Yes' when prompted
5. Select time-zone to *'(UTC) Co-ordinated Universal Time'*
6. Go-to the *'Data setup'* (second vertical tab) and press *'Auto create'* (green button)
7. Press *'Clear and load all'* (green button)

Now, the turbulence-intensity data is ready to use within your new meteo-object.

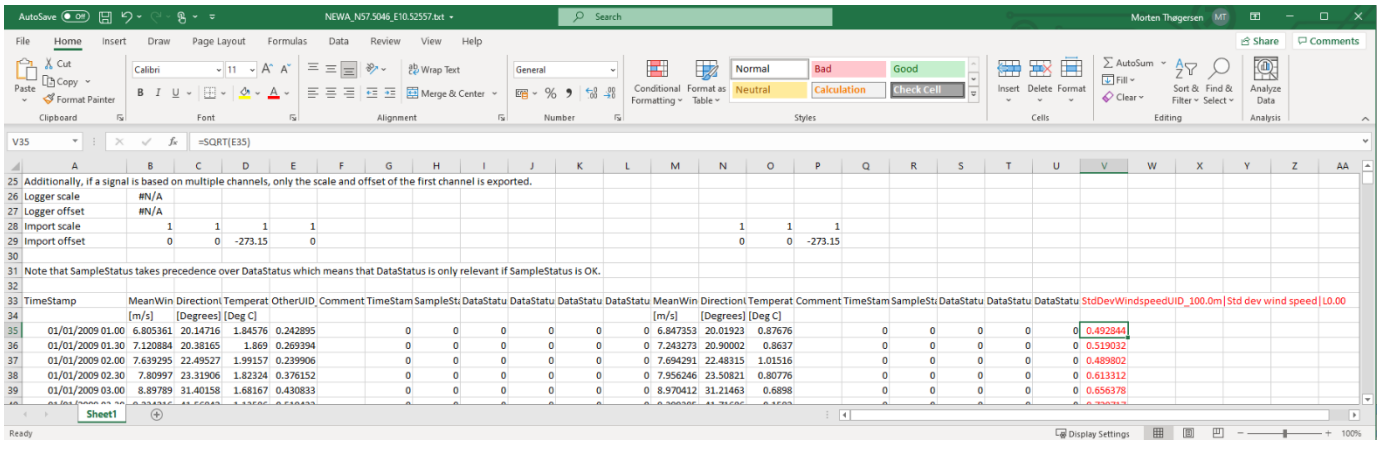

Figure: Example of NEWA data in spreadsheet.