**This ReadMe contains a brief description of the matlab scripts used to generate the SOM-FFN neural network data product.**

**This code was developed by Peter Landschützer (with modifications by Annika Jersild). When using, please cite the method as:**

Landschützer, P., Gruber, N., Bakker, D. C. E.: Decadal variations and trends of the global ocean carbon sink, Global Biogeochemical Cycles, 30, doi:10.1002/2015GB005359, 2016

**To use the published dataset, download here:** [**https://www.ncei.noaa.gov/access/ocean-carbon-acidification-data-system/oceans/SPCO2\_1982\_present\_ETH\_SOM\_FFN.html**](https://www.ncei.noaa.gov/access/ocean-carbon-acidification-data-system/oceans/SPCO2_1982_present_ETH_SOM_FFN.html)

**Included in the repository are:**

**Pre-prep: “Input\_Training\_and\_Labelling\_new\_GUI\_v2022.m” – this file has all the setup and GUI. Insure any necessary functions are downloaded and data repositories are directing to correct folders.**

**Step 1: “STEP1\_main\_matlab\_create\_biomes\_v2022.m” – This first step in the SOM-FFN creates the biomes based on MLD, SSS, pCO2, and SST input data.**

**Step 2: “STEP2\_Main\_make\_Tdata\_v2022.m” – this second step creates the required multidimensional datasets from specific datasets, one for each parameter. Parameters need to be rescaled, with training dataset structure same as labelling dataset.**

**Step 3: “STEP3\_Main\_make\_Ldata\_v2022.m” – this third step creates the Ldata, the main pre-neural-network in-situ data handling file.**

**Step 4: “STEP4\_Main\_matlab\_FFN\_v2022.m” – this fourth step uses the NN matlab package in order to create our monthly generated basin-wide fCO2 maps derived from the SOM. This must be run after the previous three steps have been run, in order. User can select input.**

**“STATS\_combine\_runs\_v2022.m” – to combine multiple runs, if the user ran one with Chl and one without.**

**“STATS\_SMOOTH\_biomes\_v2022.m” – to smooth the data**

**“FINAL\_flux\_mol\_v2022.m” – code to calculate the air-sea flux from the fCO2 data created by running the SOM-FFN. Currently, it is configured based on Wanninkhof et al., 2014. This can be adjusted by user to any choice of k parameterizations, wind product, or other input adjustments that impact the air-sea flux calculation.**