1. Correct draught data: Motivation: Fill in NA in the raw data since most of the draught data in typed in manually

Input(s): ais\_bulkers\_calcs.parquet

Output(s): ais\_bulkers\_cleaned.parquet

1. identify with speed Motivation: identify potential pot in port with speed changing criteria: the speed of the ship has been lower than 1 for continuous 12 hrs

Input(s): ais\_bulkers\_cleaned.parquet

Outputs(s): ais\_bulkers\_potportcalls\_speed.parquet

1. identify with draught(not used) Motivation: Detect potential portcalls from cleaned dynamic AIS data. criteria: the draught changing of the ship within a week is higher than 30 quantile of the draught

Input(s): ais\_bulkers\_speed.parquet

Output(s): ais\_bulkers\_potportcalls\_speed+draught.parquet, potportcalls\_speed+draught\_pre-Brexit\ex-Brexit.shp

1. Identify the exact time(not used) Motivation:identify the exact time of landing due to the potential time lag in draught changing

Input(s): ais\_bulkers\_potportcalls\_speed+draught.parquet

Output(s): ais\_bulkers\_potportcalls\_draught\_identified

1. EEZ-EU-geopandas version Motivation: Remove waterways from EEZ and assign EU status to remaining Input(s): EEZ\_land\_v2\_201410.shp, Portcall\_exclusion\_zones.gpkg Output(s): EEZ\_EU\_pre\_Brexit\ex\_Brexit.shp
2. AIS\_Calculations\_PP\_Coast\_EU\_geopandas Motivation:

1. Filter port\_in\_port by distance from coastline(5km from the coast).

2. Split data into before and after Brexit

Input(s): ais\_bulkers\_'covariant'.parquet

Output(s): ais\_bulkers\_potportcalls\_'callvariant'\_pre\_Brexit\ex\_Brexit.parquet, potportcalls\_'callvariant'\_pre\_Brexit\ex\_Brexit.shp

1. AIS\_calculations\_EU Motivation: Select only potential portcalls within a certain distance of the coast and assign EEZ (country with EU status and with waterways excluded) to them

Input(s): EEZ\_exclusion\_EU.shp, potportcalls\_'callvariant'.shp Output(s): potportcalls\_'callvariant'\_EU.csv (, portcalls\_'callvariant'\_EU\_buffer.gpkg)

1. Merge\_data Motivation: Merge portcall locations (EU or not) to AIS trips to identify trips into and out of EU

Input(s): portcalls\_'callvariant'\_EU.csv, ais\_bulkers\_potportcalls\_'callvariant'.parquet Output(s): ais\_bulkers\_pottrips.parquet, ais\_bulkers\_trips.parquet, AIS\_...\_EU\_yearly\_stats.csv