

STATO DI AVANZAMENTO DELLE ATTIVITÀ MODELLISTICHE

(State of progress of modeling activities)

AdriaClim | PP11 | Alex Pividori

Internal meeting | Palmanova | 12th October 2022

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- ☐ Description of analysis-flow for SHYFEM simulations and related outputs
- ☐ BUFR: archiviati on of in-situ buoy measures
- ☐ Buoys Data graph visualisation
- ☐ Further developments

Data Analysis

Initialization file:

- Nodes' Name
- Serial code analysed
- Time Period analysed

Initialization file:

- Statistical index
- Physical quantity

Initialization file:

- Plot type

SHYFEM
simulations
database

Data Extraction

Data Analysis

Graph realization
&
CSV archivation

ecflow suite

[AdriaClim Web-Page](#)

CSV file archive



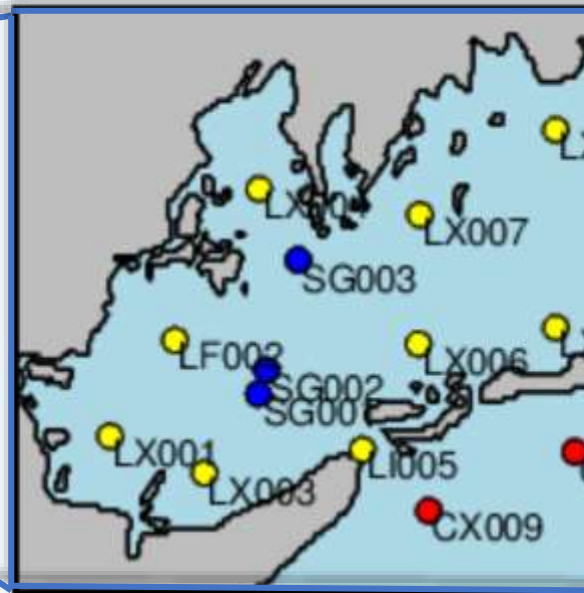
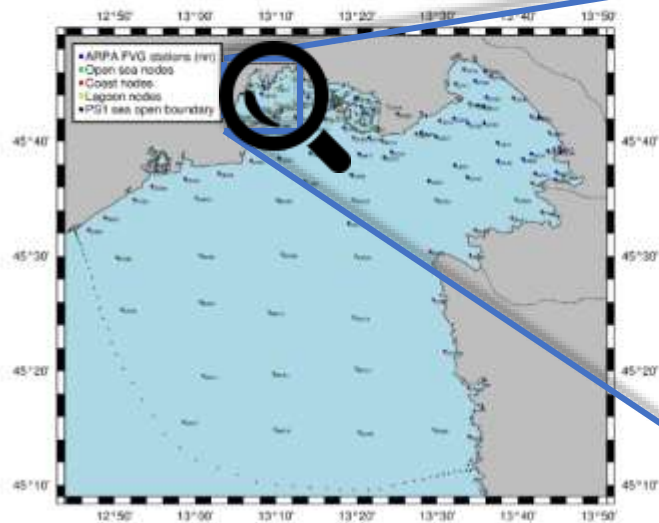
SHYFEM BENCHMARK comparison

For more informations about monitored points: Monitored points coordinates

● : RCP 2.6
 ● : RCP 4.5
 ● : RCP 8.5

118 analyzed nodes map:

AdriaClim's Modeling EXT Nodes - ARPA FVG (PP11) Pilot Site (PS1)



Graph Table



SHYFEM simulations comparison respect to 2018 BENCHMARK year

Graphic

Temperature, Salinity and Surface Height prjections

Graph Table description

Data used

SHYFEM simulations comparison respect to 2018 BENCHMARK year

Graph Type

Ensemble Model projections
(Mean Differences)



Graph Thumbnail

Search Bar by node name

Search Point...

Temperature: CB001 CB002 CB004 CB005 CB006 CB008 CB010 CB013 CB014 CB015 CB022 CB025 CB027 CB028 CB029 CB031 CB034 CF003 CF007 CF016 CF017 CN021 CP018 CP019 CP024 CP026 CP033 CX009 CX011 CX012 CX020 CX023 CX030 CX032 LF002 LF010 LI005 LI011 LI017 LX001 LX003 LX004 LX006 LX007 LX008 LX009 LX012 LX013 LX014 LX015 LX016 LX018 MX001 MX002 MX003 MX004 MX005 MX006 MX007 MX008 MX009 MX010 MX011 MX012 MX013 MX014 MX015 MX016 MX017 MX018 MX019 MX020 SB004 SB023 SG001 SG002 SG003 SG007 SG008 SG016 SG018 SG022 SG028 SN041 SP030 SP034 SP043 SP044 SX005 SX006 SX009 SX010 SX011 SX012 SX013 SX014 SX015 SX017 SX019 SX020 SX021 SX024 SX025 SX026 SX027 SX029 SX031 SX032 SX033 SX035 SX036 SX037 SX038 SX039 SX040 SX042 SX045 SX046

Salinity: CB001 CB002 CB004 CB005 CB006 CB008 CB010 CB013 CB014 CB015 CB022 CB025 CB027 CB028 CB029 CB031 CB034 CF003 CF007 CF016 CF017 CN021 CP018 CP019 CP024 CP026 CP033 CX009 CX011 CX012 CX020 CX023 CX030 CX032 LF002 LF010 LI005 LI011 LI017 LX001 LX003 LX004 LX006 LX007 LX008 LX009 LX012 LX013 LX014 LX015 LX016 LX018 MX001 MX002 MX003 MX004 MX005 MX006 MX007 MX008 MX009 MX010 MX011 MX012 MX013 MX014 MX015 MX016 MX017 MX018 MX019 MX020 SB004 SB023 SG001 SG002 SG003 SG007 SG008 SG016 SG018 SG022 SG028 SN041 SP030 SP034 SP043 SP044 SX005 SX006 SX009 SX010 SX011 SX012 SX013 SX014 SX015 SX017 SX019 SX020 SX021 SX024 SX025 SX026 SX027 SX029 SX031 SX032 SX033 SX035 SX036 SX037 SX038 SX039 SX040 SX042 SX045 SX046

Surface height: CB001 CB002 CB004 CB005 CB006 CB008 CB010 CB013 CB014 CB015 CB022 CB025 CB027 CB028 CB029 CB031 CB034 CF003 CF007 CF016 CF017 CN021 CP018 CP019 CP024 CP026 CP033 CX009 CX011 CX012 CX020 CX023 CX030 CX032 LF002 LF010 LI005 LI011 LI017 LX001 LX003 LX004 LX006 LX007 LX008 LX009 LX012 LX013 LX014 LX015 LX016 LX018 MX001 MX002 MX003 MX004 MX005 MX006 MX007 MX008 MX009 MX010 MX011 MX012 MX013 MX014 MX015 MX016 MX017 MX018 MX019 MX020 SB004 SB023 SG001 SG002 SG003 SG007 SG008 SG016 SG018 SG022 SG028 SN041 SP030 SP034 SP043 SP044 SX005 SX006 SX009 SX010 SX011 SX012 SX013 SX014 SX015 SX017 SX019 SX020 SX021 SX024 SX025 SX026 SX027 SX029 SX031 SX032 SX033 SX035 SX036 SX037 SX038 SX039 SX040 SX042 SX045 SX046

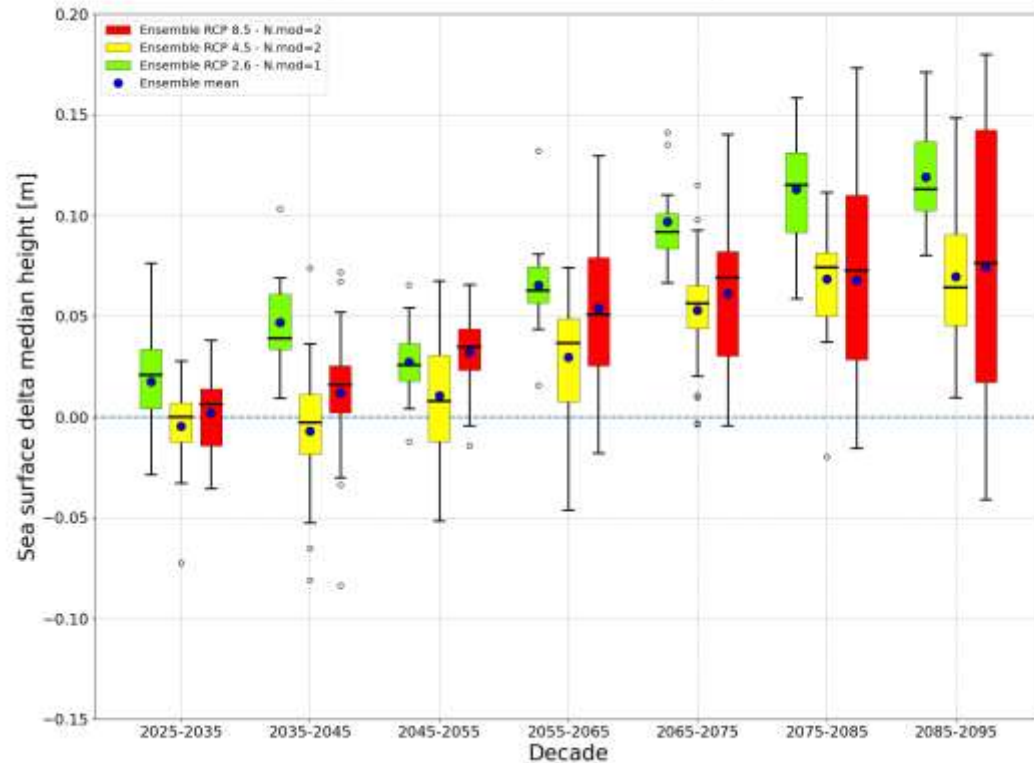
Nodes' Name

Physical quantities

Boxplots Delta Monthly Median Temperature, Salinity and Sea level height

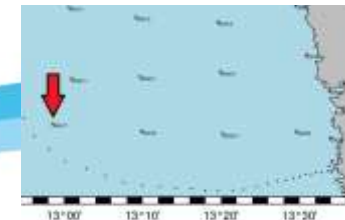
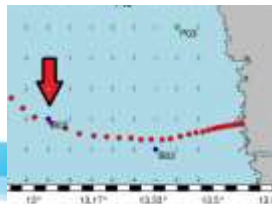
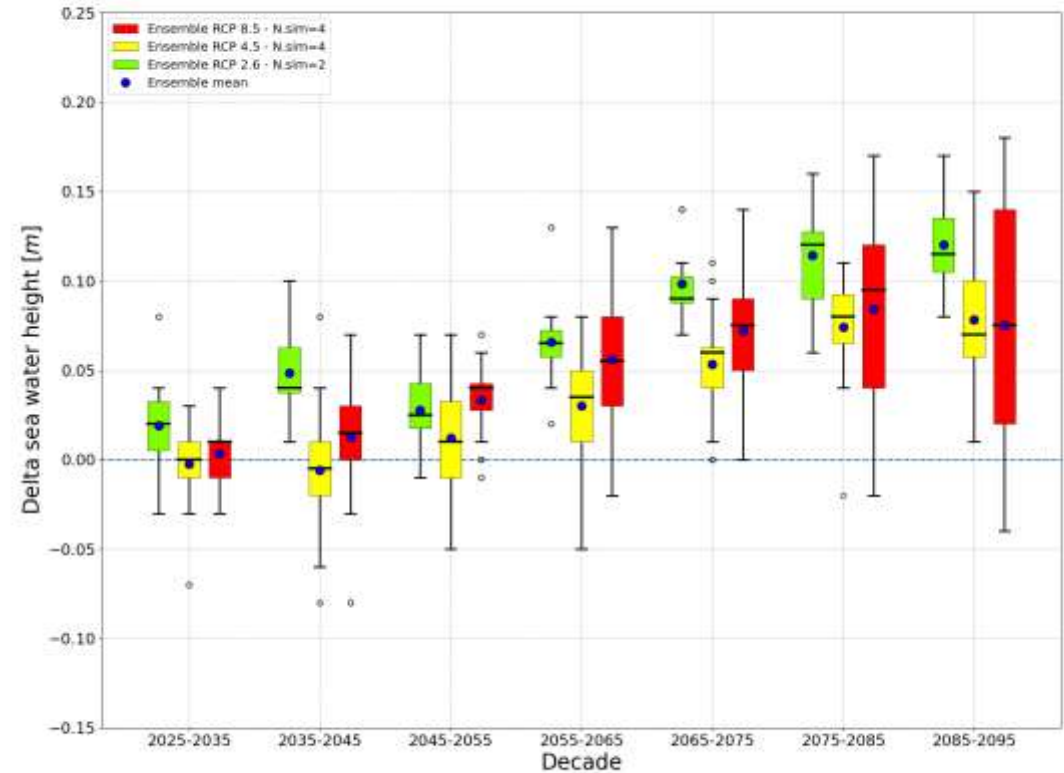
Med-CORDEX data

Delta monthly medians sea surface height scenario
respect to 2010-2020 decade at point: B02



SHYFEM simulation

Sea level monthly Median difference of all scenario respect to 2018
benchmark at point: MX017



Temperature-Salinity profiles

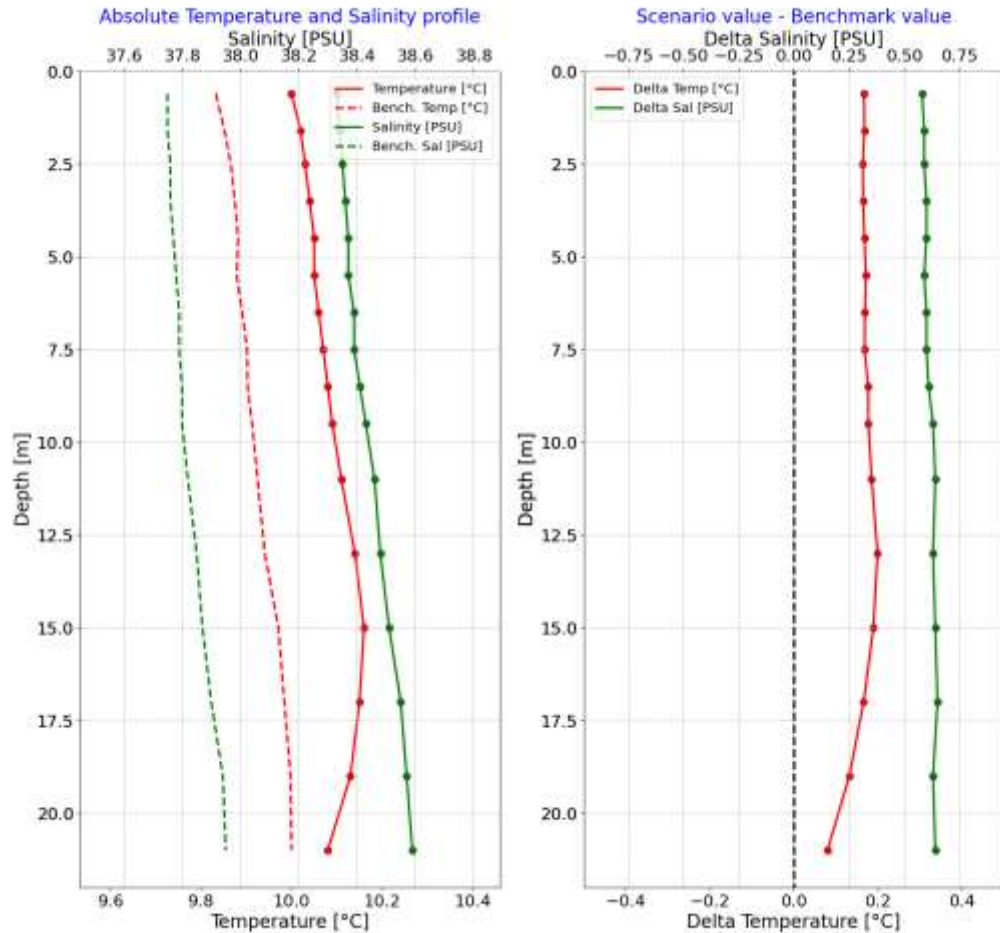
Nodes available: MX015 SX014 LX007 SG018 SX026 MX005 CX032

Months available: Jan, Apr, Jul, Oct



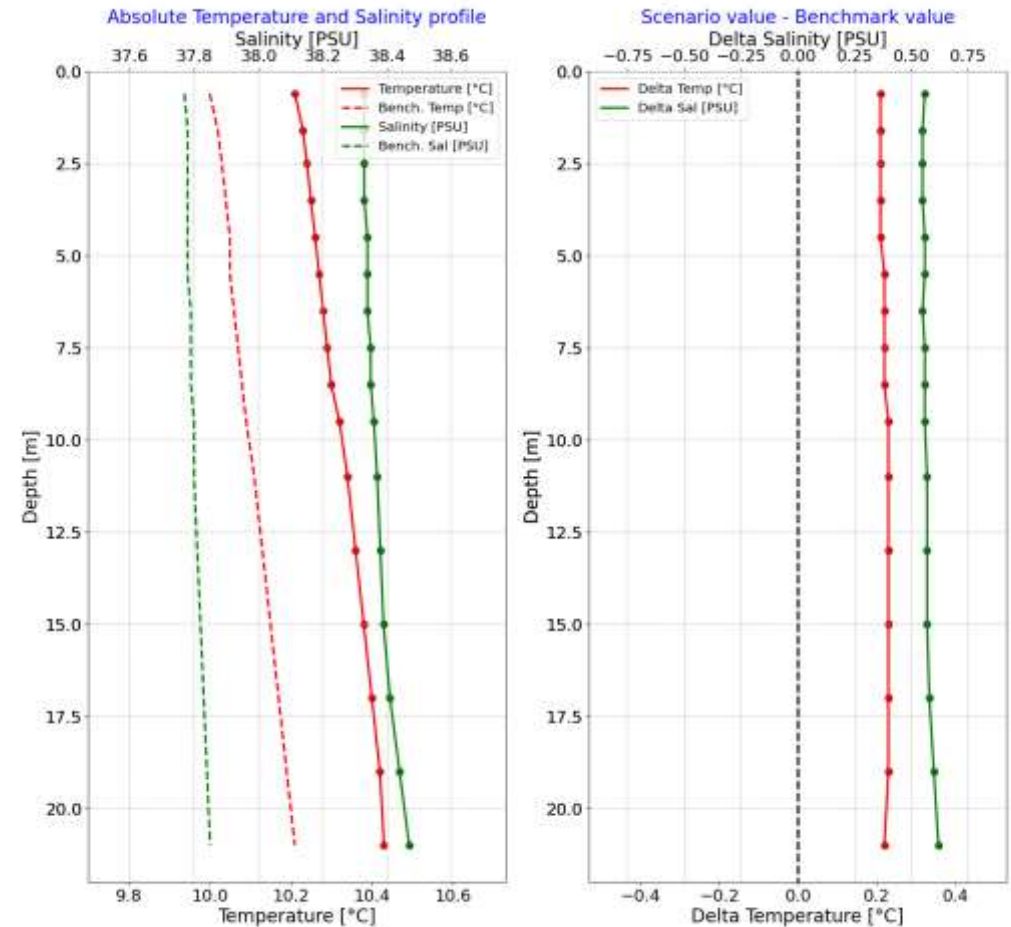
Temperature and Salinity January monthly Median profiles:

Benchmark=2018, Point=MX005, Serial Code=1997F100D0_D102, RCP=4.5, Period=2025-2035



Temperature and Salinity January monthly Mean profiles:

Benchmark=2018, Point=MX005, Serial Code=1997F100D0_D102, RCP=4.5, Period=2025-2035



BUFR format

BUFR=(Binary **U**niversal **F**orm for the **R**epresentation of meteorological data)

- Flexible binary format
- Fast in Reading and Writing
- Mainly used to encode in-situ and satellite observations
- Can also represent forecast data
- Low memory occupation

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FF FF FF FF	FF FC 01 FF	FF F0 00 00	00 00 00 00	03 10 0C 68	D1 A3	''''','''	h-f		
46 8D 1A 34	68 D2 E5 4A	9B 3E 34 6A	13 63 52 AB	1A 35 58 D5	6A 55	Fç 4h“ÂJö>4j	cR' 5X'jU		
AB 56 34 68	D1 A3 46 8D	1A 34 68 D1	A3 46 8D 1A	34 60 37 37	37 37	'V4h-fFç 4h-fFç	4`7777		

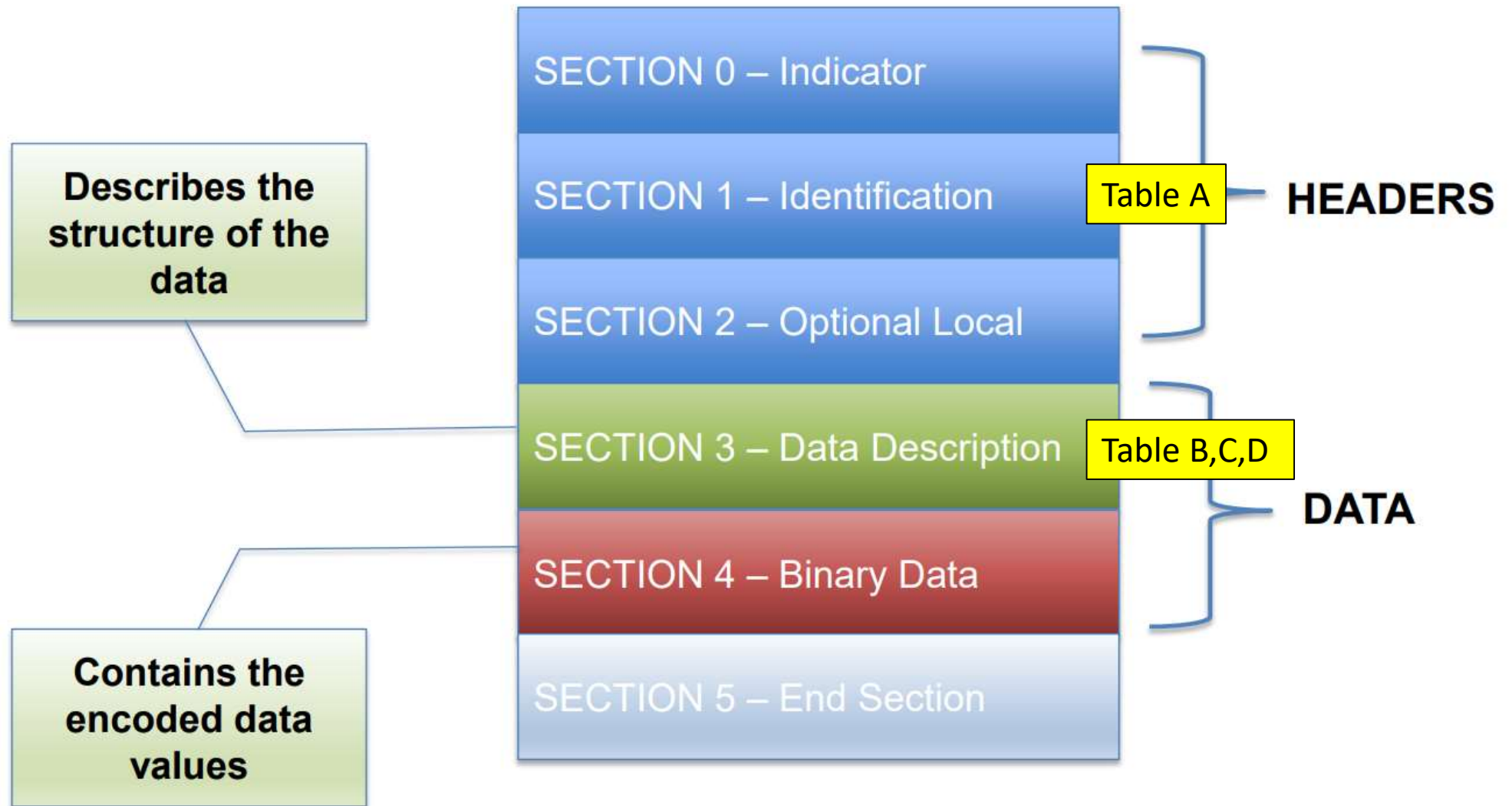
Documentation:

<https://confluence.ecmwf.int/display/ECC/Documentation>

<https://apps.ecmwf.int/codes/bufr/validator/>

<https://community.wmo.int/activity-areas/wmo-codes/manual-codes/bufr-edition-3-and-crex-edition-1>

BUFR structure





BUFR handling

European Centre for Medium-Range Weather Forecasts

ecCodes is a package developed by ECMWF which provides an application programming interface and a set of tools for decoding and encoding messages in the following BUFR formats:

WMO FM-94 **BUFR** [edition 3](#) and [edition 4](#)

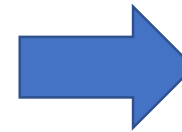
<https://confluence.ecmwf.int/display/ECC/ecCodes+Home>



C, Fortran 90 and Python interfaces provide access to the main ecCodes functionality.

eccodes Python module.

Documentation: http://download.ecmwf.int/test-data/eccodes/html/namespaceec_codes.html



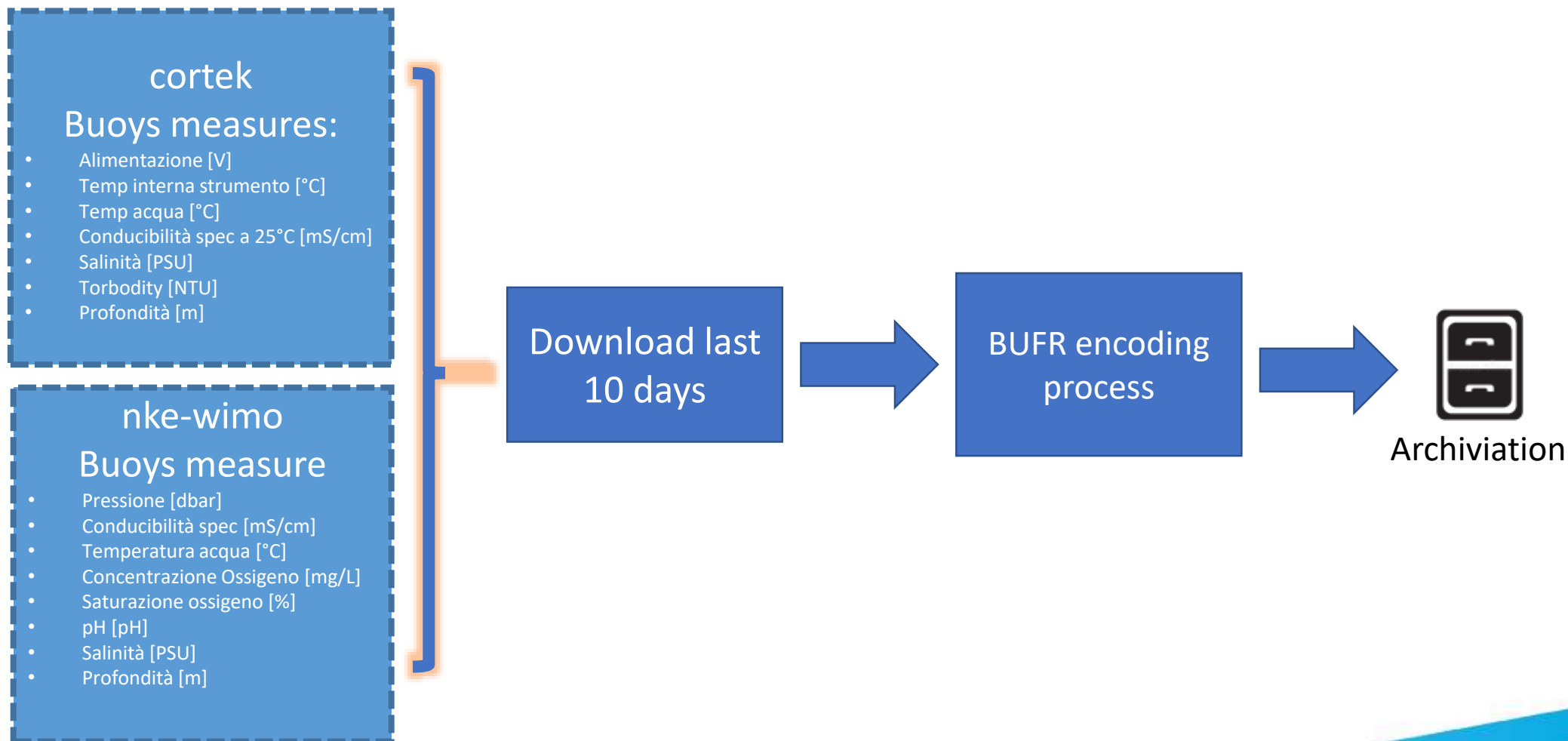
A useful set of [command line tools](#) provide quick access to the messages.

bufr_compare
bufr_copy
bufr_count
bufr_dump
...

<https://confluence.ecmwf.int/display/ECC/BUFR+tools>

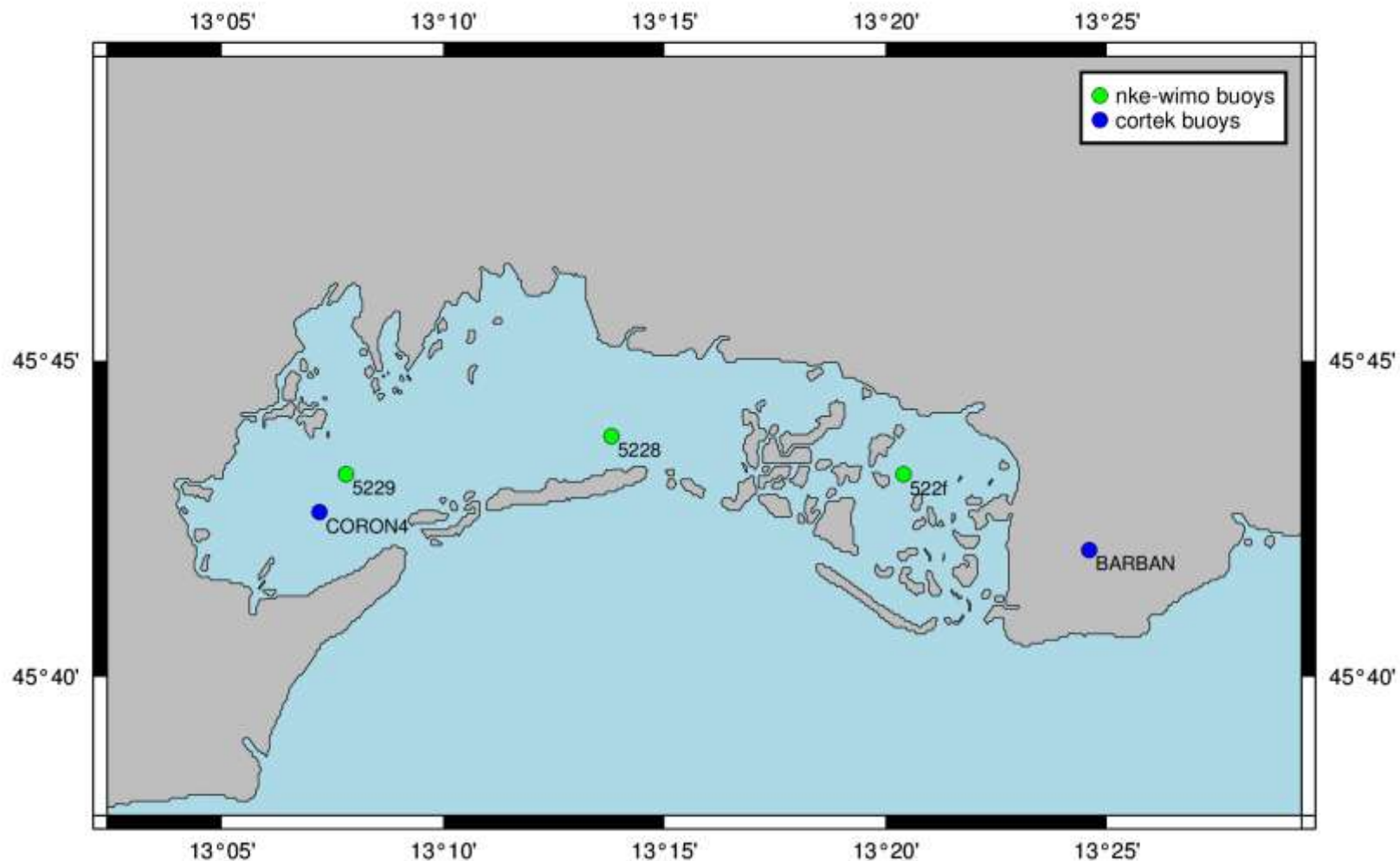
Buoy Data encoding

csv and xml data format



Buoys positions

Buoys positions: nke-wimo and cortek

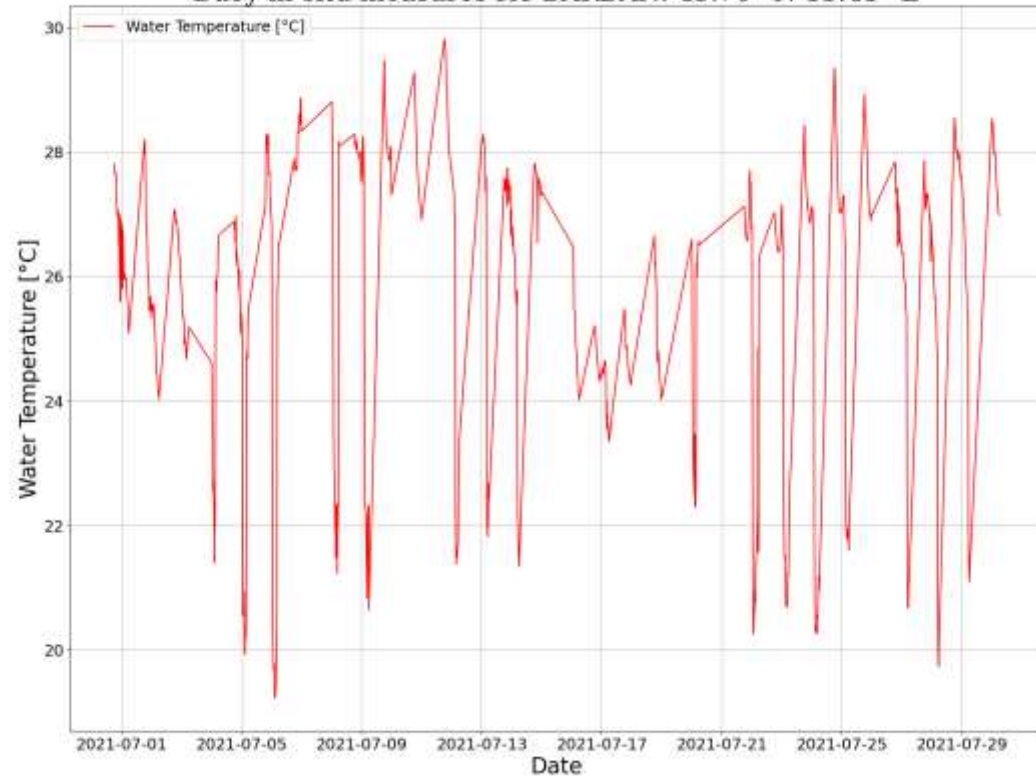


Buoys data time series

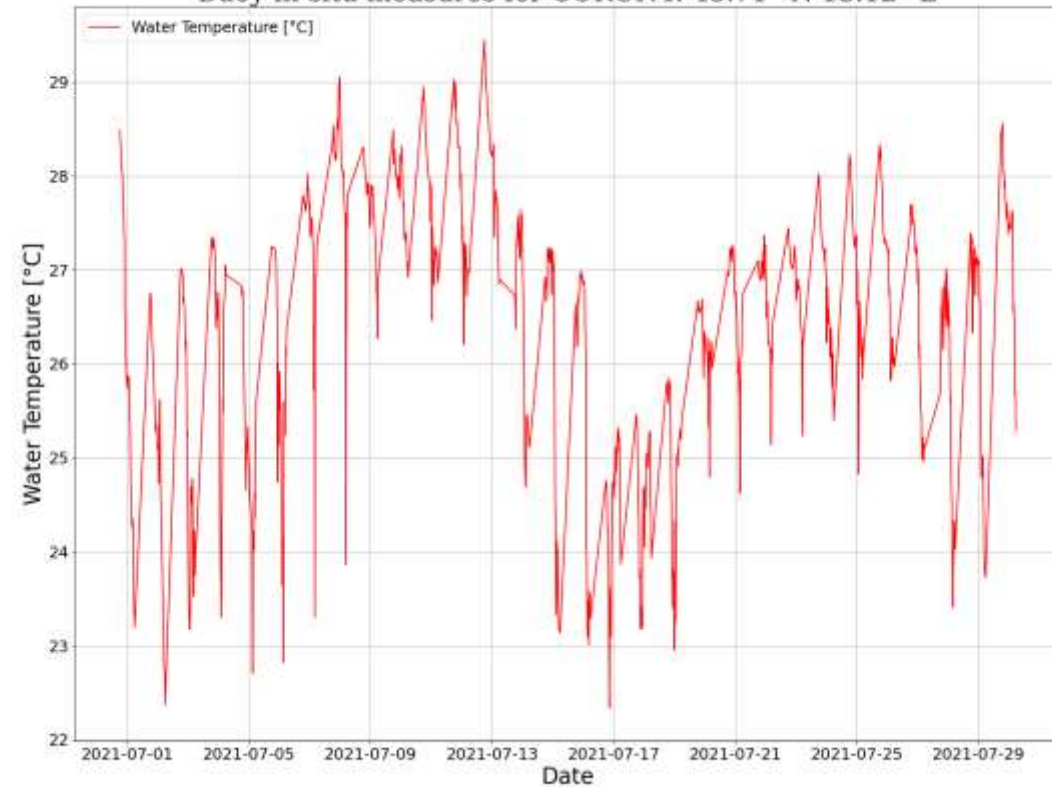
BARBAN

CORON4

Buoy in-situ measures for BARBAN: 45.70 °N 13.41 °E



Buoy in-situ measures for CORON4: 45.71 °N 13.12 °E



Foreseen next activities and further developments:

- Implementation of an ecflow suite for buoy data conversion into BUFR files
- Creation of a web-page for buoy-graphs sharing
- SHYFEM simulations by CMCC's boundary conditions RCP 8.5 (2006-2050)

CONTACT INFORMATION

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