AdriaClim
stato di avanzamento e attività previste per il 2022

AdriaClim| PP11 | ARPA FVG

Presentazione interna | Palmanova | 27 January 2022

European Regional Development Fund

Sintesi degli argomenti della riunione

Stati di avanzamento e attività previste nel 2022 del progetto AdriaClim

attività WP1 – stato rendicontazione costi sostenuti, compilazione timesheet, proiezioni impiego budget per il 2022

attività WP2 – andamento delle comunicazioni progettuali, pubblicazione news, materiale comunicativo accessorio, eventi comunicativi previsti per il 2022

attività WP3 – prodotto modellistici ed elaborazioni dati realizzate e da realizzare per conseguire le deliverable sull'area pilota del FVG

attività WP4 – accessibilità elaborazioni dati, simulazioni e loro archiviazione permanente

attività WP5 – simulazioni di impatto dei cambiamenti climatici sulle attività antropiche e gli ecosistemi, stato di avanzamento delle deliverable riguardanti le azioni di adattamento

Ricordiamo che AdriaClim è un progetto strategico INTERREG IT-HR

Strategic theme: 2 - **Climate change adaptation**

Specific objective: 2.1 - **Improve the climate change monitoring and planning of adaptation measures tackling specific effects, in the cooperation area**

Project acronym	AdriaClim
Project title	Climate change information, monitoring and management tools for adaptation strategies in Adriatic coastal areas
Start date	01/01/2020
End date	31/12/2022

SAFETY AND RESILIENCE

S.O. 2.1

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Ricordiamo l'obiettivo generale e principale di AdriaClim

Project overall objective

The main objective of AdriaClim is to improve climate resilience in the cooperation area, by increasing the capacity to develop new climate adaptation plans and update existing ones and develop mitigation strategies based on high resolution, more accurate and reliable climate information (**observations and integrated modeling**) focused on the coastal and marine areas (threatened by risks such as sea level rise, sea temperature and salinity anomalies, coastal erosion and salinization of freshwater) and related economic sectors and ecosystem services. AdriaClim aims at developing an Adriatic scale regional plus local scale for each Pilot **integrated information systems composed by hydro-meteo-marine climatological databases (model scenarios and observation) and knowledge-based tools (e.g indicators)** for advanced dynamical implementation of regional climate adaptation plans relevant and accessible for entire the Programme area and Countries.

Un richiamo sui due principali risultati progettuali

Climate change monitoring (observation and modelling) systems

The project will foster collaboration among Croatian and Italian partners for improving and setting up cross-border methodologies/protocols on coastal/marine monitoring with a **focus on harmonizing and improving accessibility of observing and modeling tools and products.** It will contribute to **develop the Adriatic Sea regional integrated Monitoring Systems focus on hydro-meteo-marine climatological dimension**. **Integrated monitoring systems** will be put in place: 4 in Italy (EMR, Puglia, Veneto and **FVG**) and 4 in Croatia (Split, Neretva, Northern Adriatic, Slano bay) dealing **with different typologies of data (e.g. Sea level, sediments, nutrients, carbon dynamics, etc.**). The **monitoring systems include also integrated modelling tools both at Adriatic Basin scale and high resolution coastal scale** for pilots. **Workshops and trainings addressed to stakeholders will be carried out at each *pilot*** also with the aim of optimal planning of the monitoring systems.

Adaptation and mitigation plans/measures

Climate change risks and vulnerability maps will be developed for each targeted *pilot* case study. Workshops and trainings addressed to stakeholders together with **participatory actions will be carried out at each *pilot* in order to analyse requirements and present results**. At least 5 **local/regional adaptation plans/measures will be designed and adopted/updated by relevant authorities** in coastal territories. **Permanent cross-border Expert Management Body will be set up** and will help to foster the collaboration on adaptation planning and mitigation measurements among Italian, Croatian and International institutions.

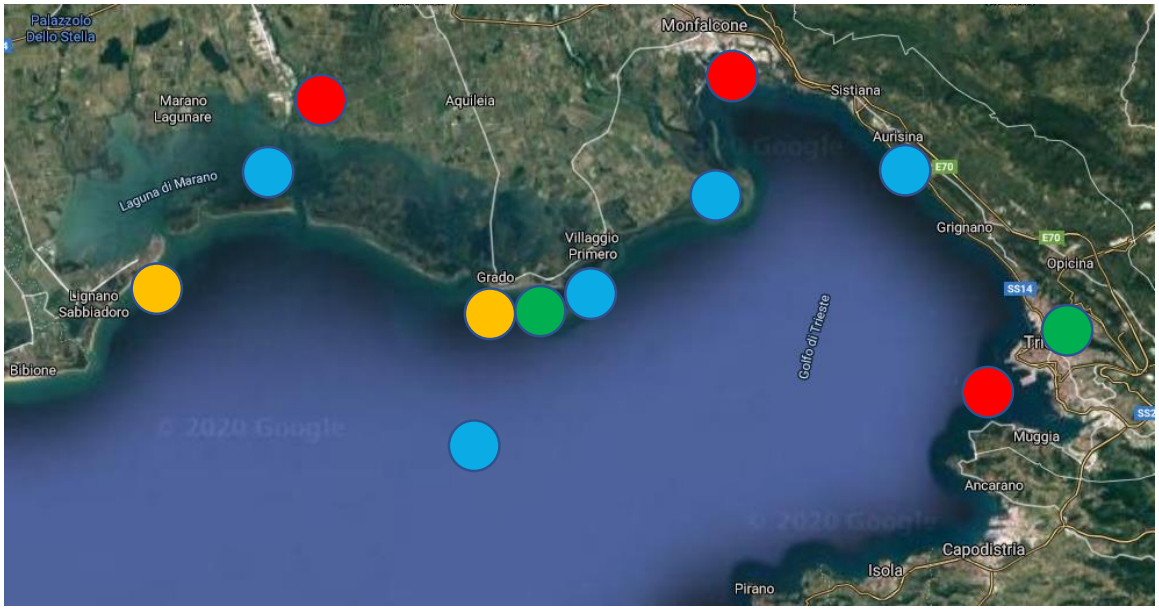
Un richiamo sui risultati progettuali attesi

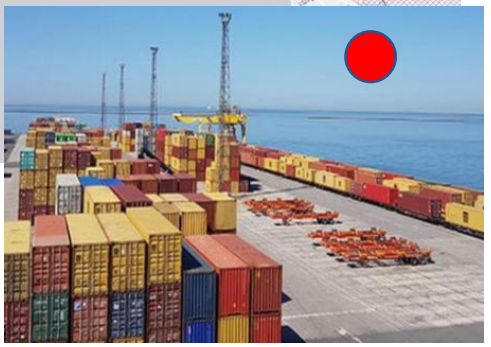
Project results

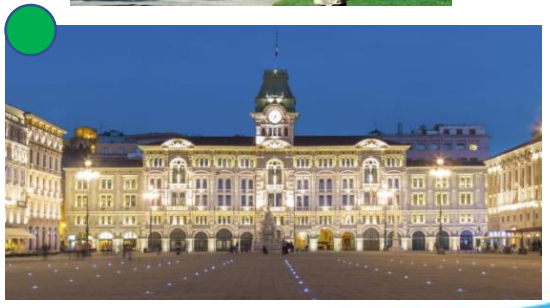
AdriaClim will improve the knowledge on climate change and it will achieve the following results:

- To improve and harmonize the access to observing and modelling tools and products (data platform, distributed database, innovative access tools) by setting up crossborder methodologies/protocols;
- To set up new and improve existing regional and coastal high-resolution integrated meteo-hydro-ocean and ecological climate monitoring systems (observations and models). 7 integrated monitoring systems each focusing of different variables will be put in place dealing with different typologies of data: sea level, temperature, salinity, sediment, carbon, nutrients, ecosystem variables, atmospheric and ocean variables
- To assess the impacts, vulnerability and risks and develop maps and indexes for pilot case studies on the blue economy (aquaculture, tourism); marine ecosystems services by Marine Protected Areas (MPA); coastal towns (population), and ports.
- To design adaptation plans (at least 3 in IT and 2 in HR) at different scale (e.g. local and regional) to be adopted by the relevant authorities in coastal territories
- To organize workshops to present future climate conditions and impacts
- To organize trainings for public and private stakeholders on adaptation measures, governance systems, monitoring of the actions, for the creation of new jobs in the field of adaptation and mitigation.
- To set up a Transnational Expert Management Body (TEMB)

La nostra Pilot area di [PP11 – ARPA FVG]







Pilot area features

- Environment type: coastal areas, lagoon and open sea
- Relevant ecosystems: Natura 2000 sites
- Important anthropic activities: harbors, tourism, historical sites

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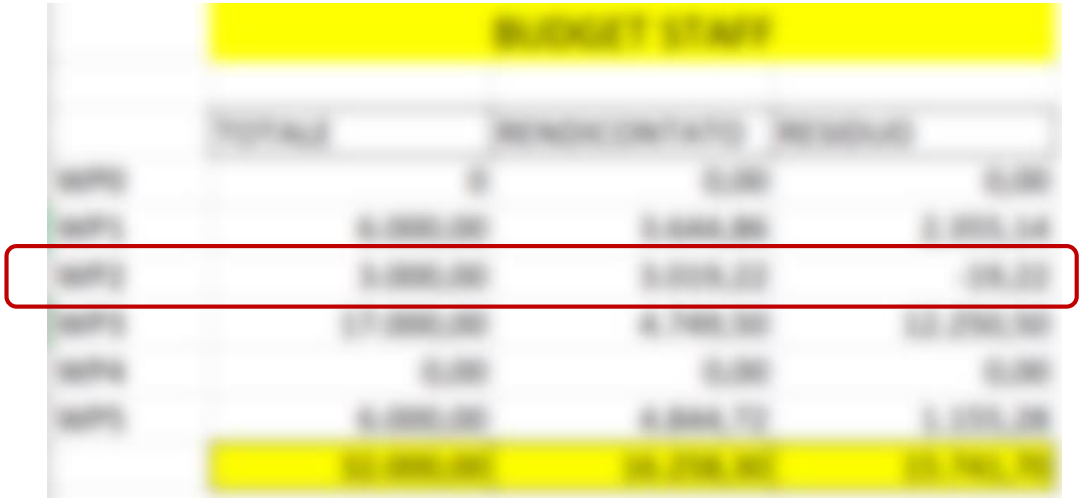
WP1 – rendicontazione costi sostenuti, proiezioni impiego budget per il 2022

Previsione spesa per il 2022

WP1 – stato rendicontazione - compilazione timesheet,



COMPAGINE DI PROGETTO	
Collega	ore dichiarate 2021
A	5
B	15
C	128
D	247,5
E	0
F	69
G	41
H	2

- Le college che si occupano di amministrazione e budget, rendicontino sul WP1
- Federica insista sul WP5 fino ad esaurimento budget e poi passi al WP3
- Elena rendiconti sul WP1 e WP5
- Tutti gli altri rendicontino sul WP3

Non esitare a chiedere chiarimenti al capoprogetto in caso di dubbi su quale azione inserire le ore di lavoro svolto

Le/I colleghi **A, E**, ed **H** debbono rendicontare con più attenzione le ore svolte per il progetto

La/Il collega **B** deve fare attenzione a non dimenticare anche le ½ ore svolte per il progetto.

Gli altri colleghi proseguano come hanno fatto fino ad ora

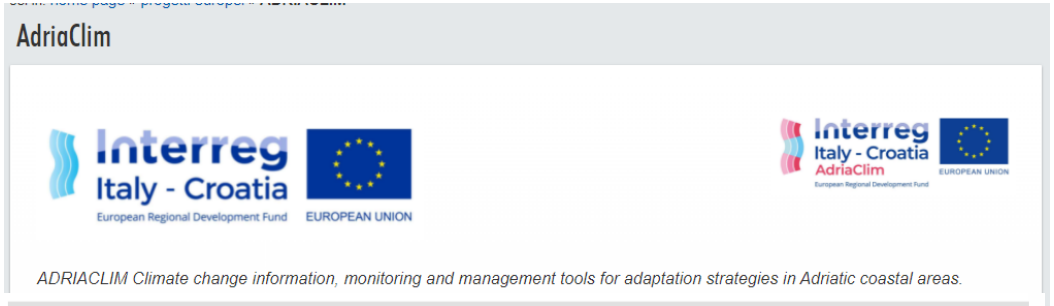
WP1 – Richiamo ai Project Assignments

WP2 – andamento delle comunicazioni progettuali, pubblicazione news

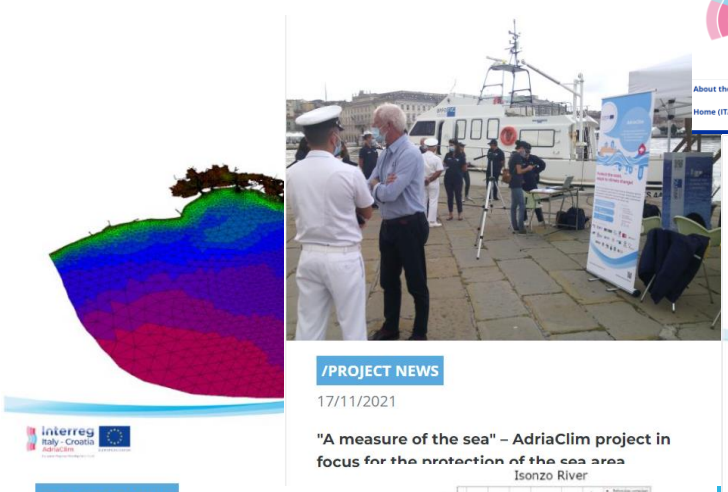
Pagine web agenziali http://www.arpa.fvg.it/cms/istituzionale/servizi/progetti_europei/adriaclim.html (proseguire come in 2021)

News pubblicate: 5 [2020] 12 [2021] almeno 12 [2022] - Proporre contattando Elena (CC a Dario)

Socials: 1 [2020] 30 [2021] almeno 12 [2022] - Mantenere interazione forte con la Redazione di ARPA FVG



Sito web di progetto https://www.italy-croatia.eu/web/adriaclim
siamo presenti (4/15)
Nel 2022 proseguire comunicando le nostre news (italiano/inglese la responsabile del WP2)



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WP2 –materiale comunicativo

OK, Leaflet stampati

OK, Poster stampati e affissi

OK, Roll up realizzato ed usato

Altro materiale comunicativo? (probabilmente non serve)

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WP2 – eventi svolti ed eventi previsti per il 2022

1st event held from 19 to 24 July, 2021.

"**NanoValbruna** – from 19 to 24 July 2021 Malborghetto Valbruna (UD)"

2nd online meeting held on September 22, 2021.

"**9th SISC Annua** - 22 and 24 September 2021"

S.1.2 – Climate trends: changes in means and extreme events in observations, simulations and projections

3rd event held on September 25, 2021.

"**Non Siamo Atlantide** - Aquileia - 25 Settembre 2021"

4th event held on September 27, 2021.

"**A Misura di Mare** - Trieste - 27 Settembre 2021"

4 eventi in cui il progetto è stato presentato, promosso e i risultati presentati

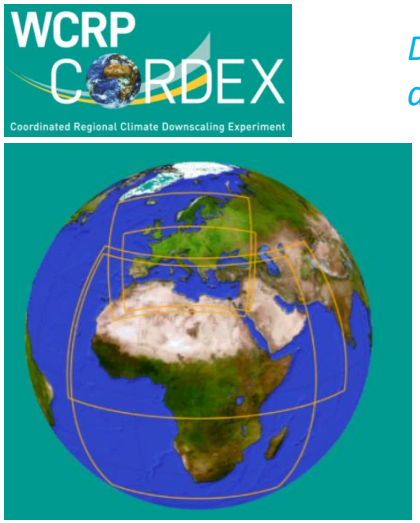
Per il 2022 **Non esitare a fare proposte**

- Partecipazione ad almeno una conferenze scientifica – portando i risultati progettuali
- Partecipare ad almeno un paio di eventi comunicativo
- Organizzare in Workshop per illustrare dati prodotti e loro accessibilità – [inizio estate – inizio autunno]
- Pubblicazione articoli su riviste specializzate (auspicabile)

WP3 – prodotto modellistici ed elaborazioni dati realizzate e da realizzare per conseguire le deliverable sull'area pilota del FVG

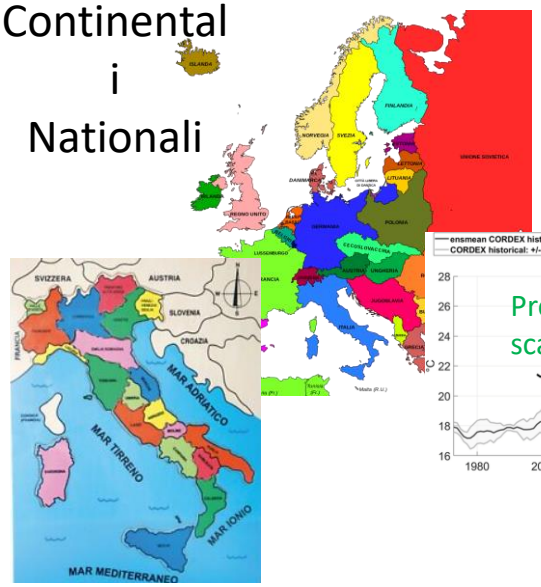
Il quadro generale è tracciato; mancano i dettagli dell'evoluzione locale e degli eventi estremi locali

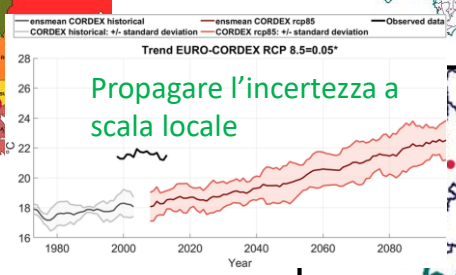
Proiezioni
globali
continentali



Dynamic downscale

Azioni
Continentali
i
Nationali





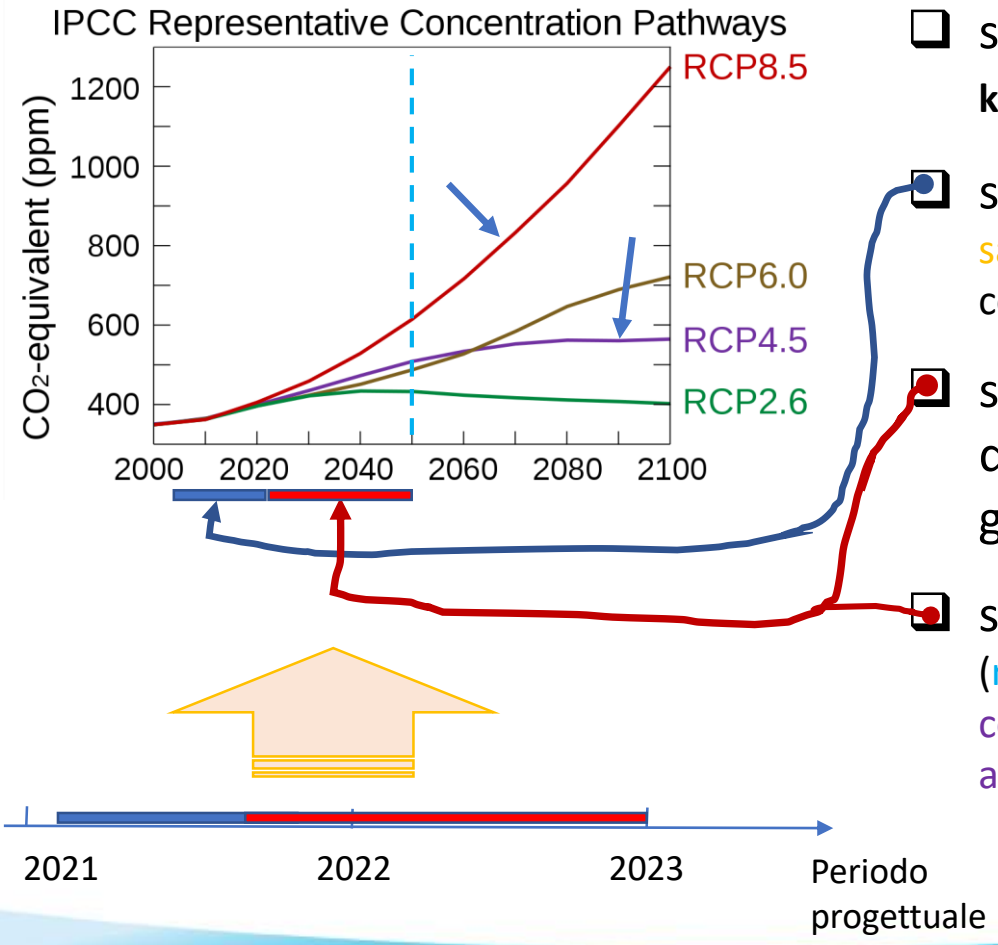
Propagare l'incertezza a scala locale

Azioni
Regionali
Comunali

Richiesto ulteriore dettaglio

WP3 – prodotto modellistici ed elaborazioni dati realizzate e da realizzare per conseguire le deliverable sull'area pilota del FVG

Con riferimento all'area pilota del Friuli Venezia Giulia saranno eseguite:



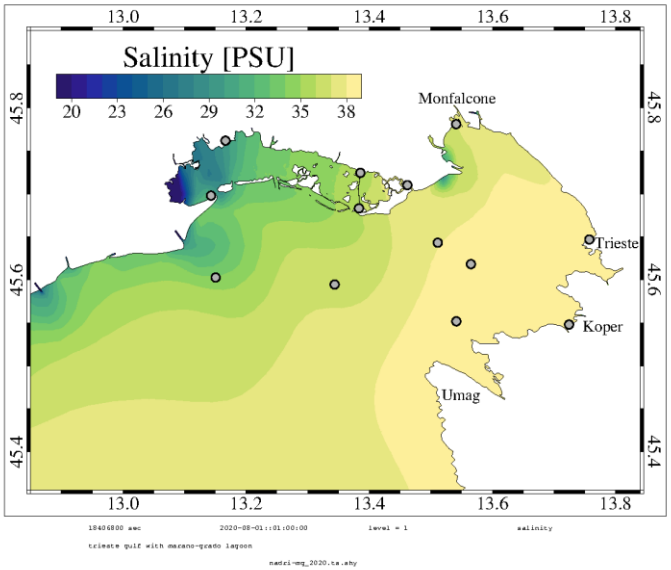
- simulazioni numeriche ad alta risoluzione spaziale (**da 2 km** in mare aperto **a 10 m** in laguna);
- stato attuale dei parametri fisici ambientali (temperatura, salinità, correnti e livello del mare ora per ora per alcuni anni presi come riferimento);
- scenari (RCP 4.5 e 8.5) futuri (fino al **2050** e **2100**) dell'ambiente, determinati dai cambiamenti climatici globali (temperatura, salinità, correnti e livello del mare);
- simulazioni di impatti su specifici processi ambientali (rimescolamento ed ossigenazione delle acque, frequenza delle condizioni meteo marine favorevoli alle mareggiate e alle acque alte).

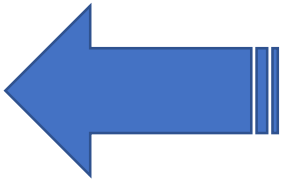
WP3 – lo stato attuale e il riferimento sull'area pilota del FVG

1st release of yearly benchmark simulation (2018)

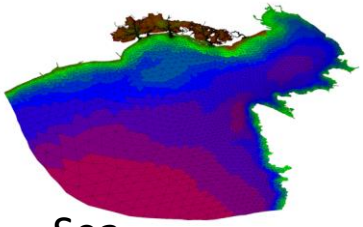
CNR-ISMAR (PP1) boundary conditions + ARPA FVG (PP11) WRF analyses

Improvements in progress – releases 01 and 02 already available





CNR ISMAR ISTITUTO DI SCIENZE MARINE



Boundary conditions

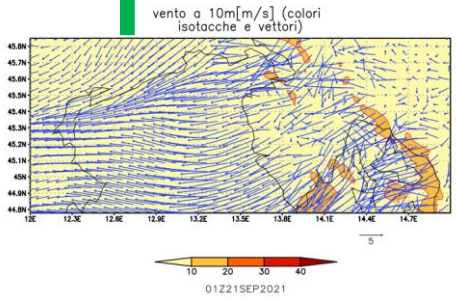
Sea

S.HY.F.E.M. Shallow water Hydrodynamic Finite Element Model

Atmospheric forcing

Atmosphere

WRF



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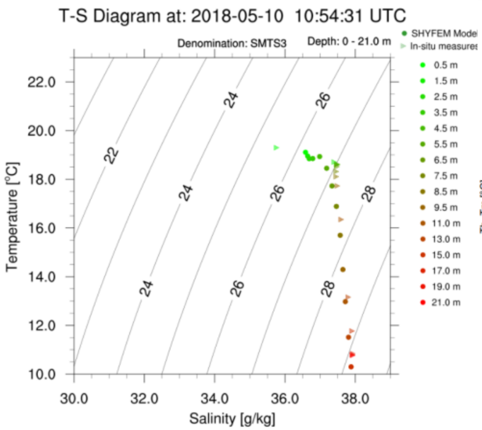
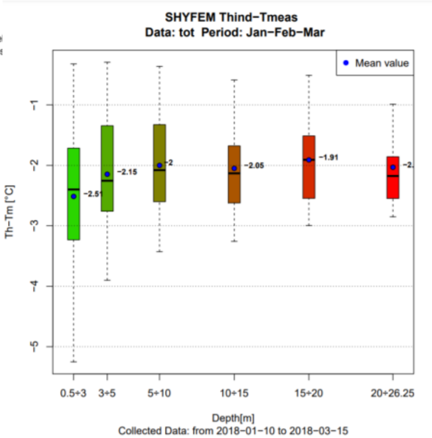
WP3 – Validazione e controllo qualità del benchmark

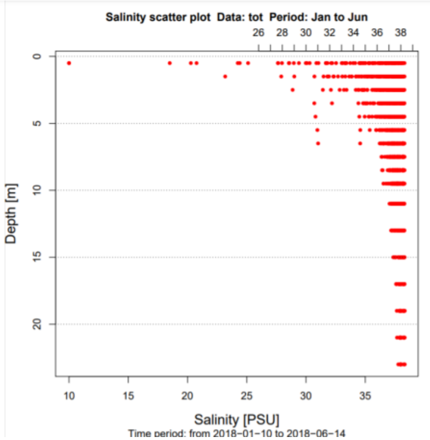
Validated 1st benchmark simulation against ARPA FVG measures

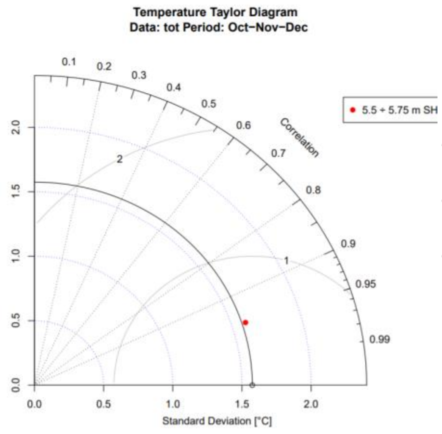
Computational flow development to validate automatically each benchmark and Climate Change sensitivity case simulation

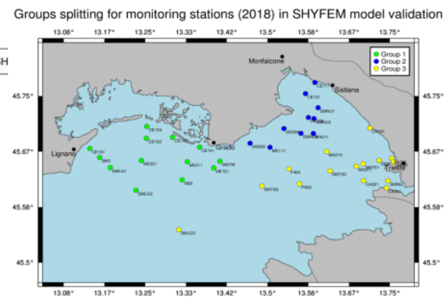
http://interreg.c3hpc.exact-lab.it/AdriaClim/SHYFEM_1995F100D0_AB01_validation/SHYFEM_1995F100D0_AB01_HIND_validation.php











SHYFEM model validation for Northern Adriatic Sea (2018 Period)

SHYFEM validation results	Jan-Feb-Mar	Apr-May-Jun	Jul-Aug-Sep	Oct-Nov-Dec	First Semester	Second Semester	Annual
TS-Diagrams	Group 1 Group 2 Group 3	Group 1 Group 2 Group 3	Group 1 Group 2 Group 3	Group 1 Group 2 Group 3			
Boxplot	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal
Scatter Plot	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal	Group 1: Temp Sal Group 2: Temp Sal Group 3: Temp Sal All stations: Temp Sal
Taylor Diagrams	Temp: 0.5 5.5 9.5 m Sal: 0.5 5.5 9.5 m	Temp: 0.5 5.5 9.5 m Sal: 0.5 5.5 9.5 m	Temp: 0.5 5.5 9.5 m Sal: 0.5 5.5 9.5 m	Temp: 0.5 5.5 9.5 m Sal: 0.5 5.5 9.5 m	Temp: 0.5 5.5 9.5 m Sal: 0.5 5.5 9.5 m	Temp: 0.5 5.5 9.5 m Sal: 0.5 5.5 9.5 m	Temp: 0.5 5.5 9.5 m Sal: 0.5 5.5 9.5 m

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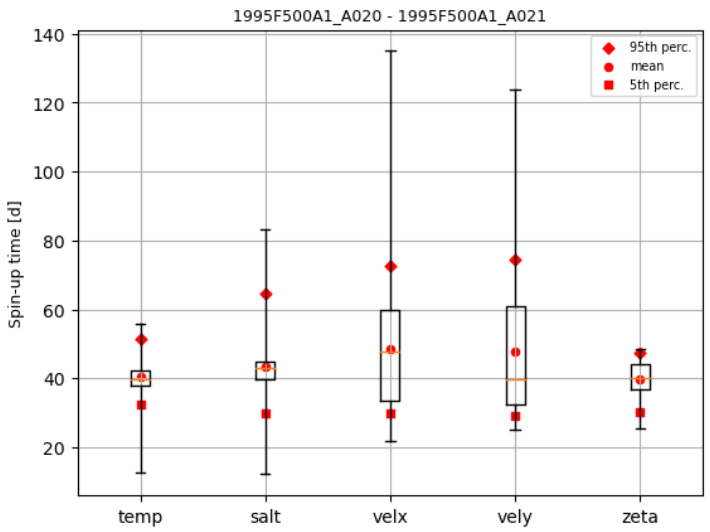
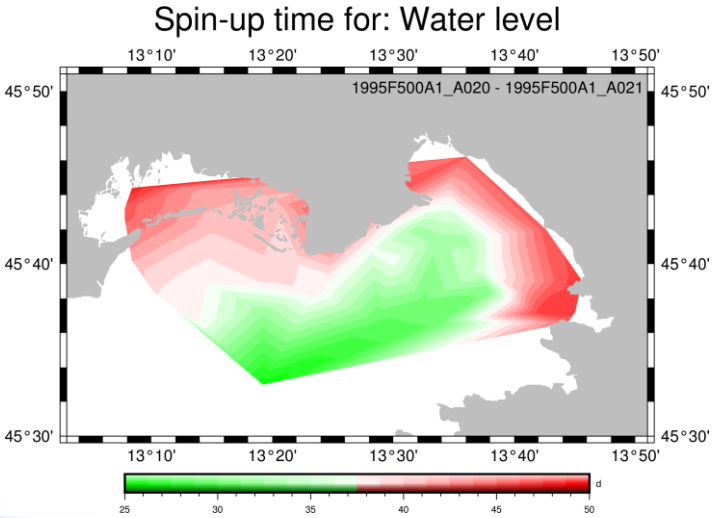
attività WP3 –simulations spin up analysis

Winter





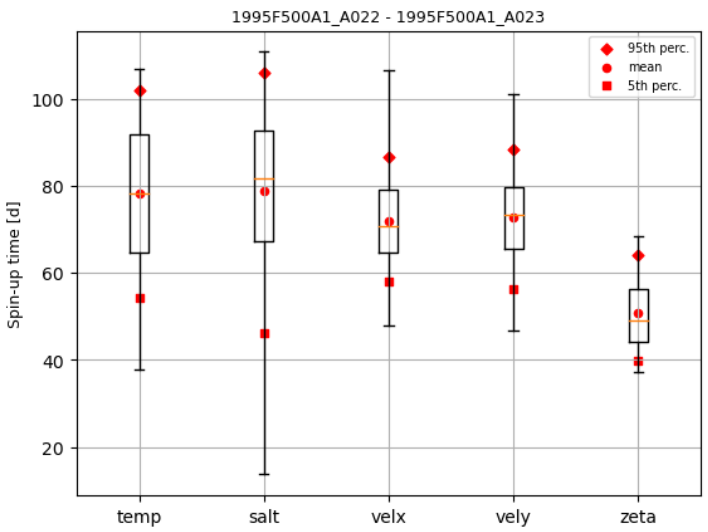
The spin up time for the pilot domain has been computed and its seasonal and spatial variability analyzed.

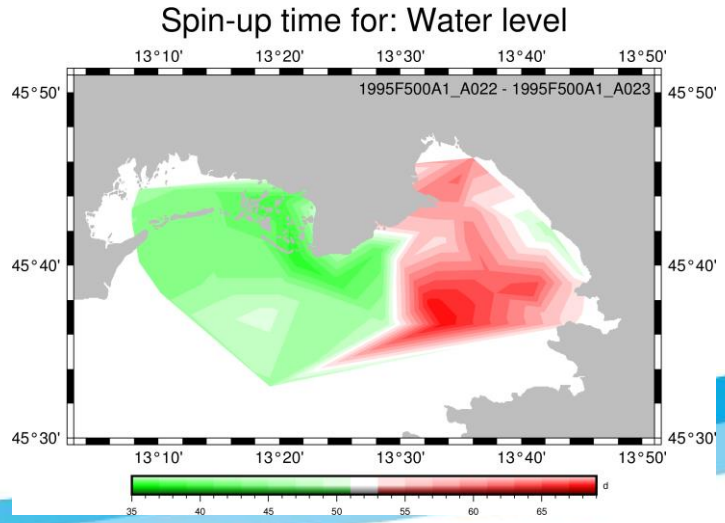
Overall spin up summarizes times for each relevant simulated field:

- Temperature
- Salinity
- Velocities
- Sea level

Winter (50 ± 10) days
Summer (80 ± 15) days

Summer





WP3 – Alcuni problemi da superare per essere soddisfatti del benchmark

- Simulation drifts and codes instability (fixed) (thanks to CNR-ISMAR (PP1))
  - Boundary conditions refinement

- Low scalability (optimization reached)
  - Limited number of cores for each run (8) (thanks to CNR-ISMAR (PP1))
  - Computational flow development and simulation classification defined for massive bunch of simulations

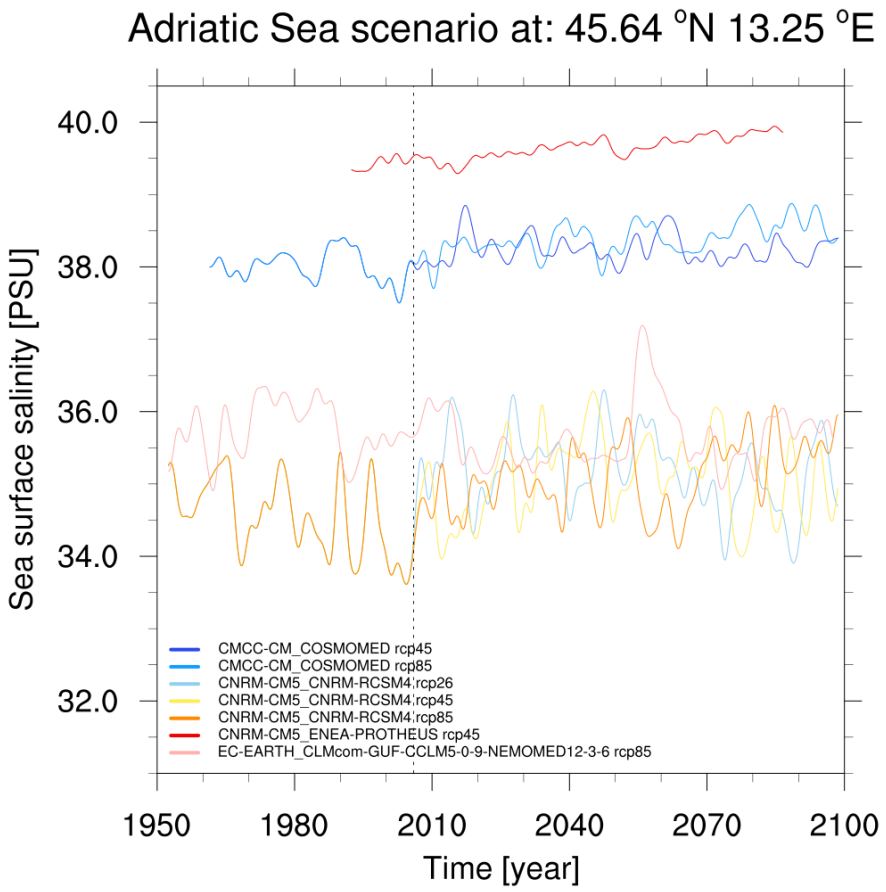
- No full WRF forcing direct input (work in progress)
  - Long wave radiation, latent and sensible heats not accepted as inputs
  - Bypassed via air temperature, relative humidity and cloud cover

- Availability of BC and RCPs (work in progress and workaround)
  - Workaround – define and run sensitivity cases
  - Prepare workflows to be ready for runs with SubRESM scenario BC

WP3 – prodotto modellistici ed elaborazioni dati Modelling activity at pilot : MED-CORDEX scenarios

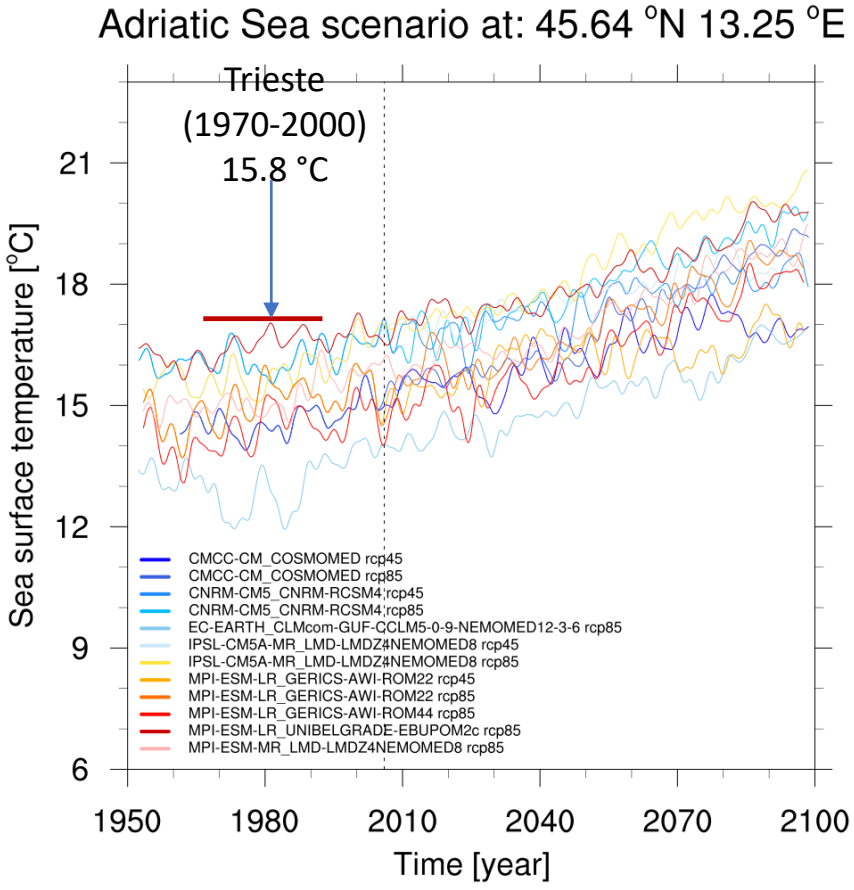
Temperature Salinity, Sea Level height and U and V currents

- Retrieval, subdomain (Adriatic basin) and regrid surface fields for RCPs 4.5 and 8.5 (in progress and almost completed)
- Retrieval, subdomain (North Adriatic) and regrid 3D fields for RCPs 4.5 and 8.5 (Planned since mid December 2021)



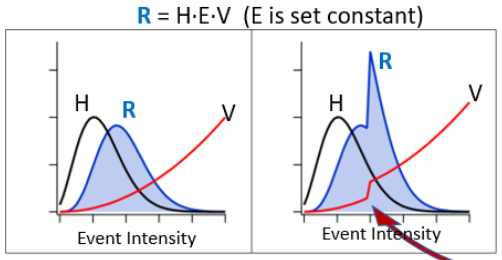
Define the set of sensitivity cases to run on the Pilot FVG
(at least 2 RCPs sets)

Support the evaluation of indicators uncertainty for each RCP



attività WP3 – simulazioni di impatto e sensitività ecosistemi

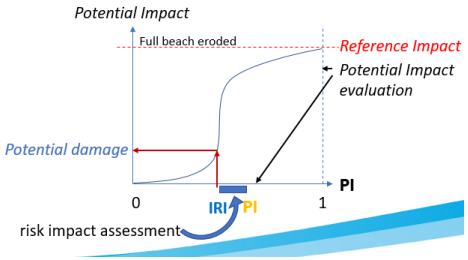
Inizio modellistica ecosistemi (in generare sistemi dinamici complessi) [un tentativo]

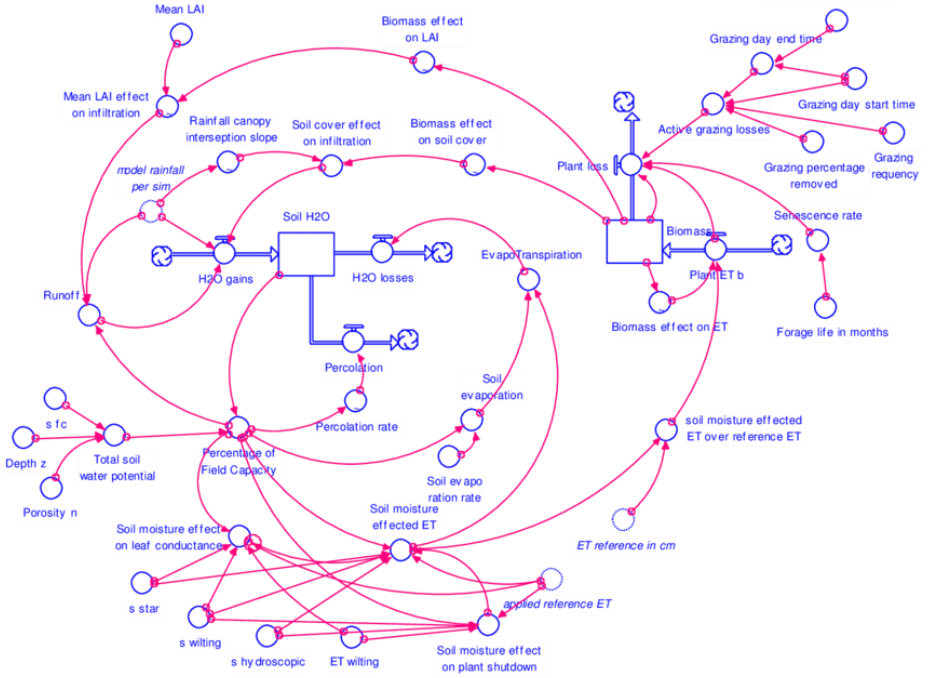


Adaptation is a function of the hazard type and probability (frequent events does not allow to adapt, rare and strong events too, while trends does, but up to the breaking point)

IRI = R · PI

Stakeholder is interested in the potential damage





INPUT: Determinanti

- Simulazione stato ecosistema marino
- Simulazione stress specie marine
- Simulazione di impatti su attività antropiche

Stella® Simulator

Stella® Architect

- Impatti climate change
- Vulnerabilità attuale

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WP4 – accessibilità dati, simulazioni e loro archiviazione permanente

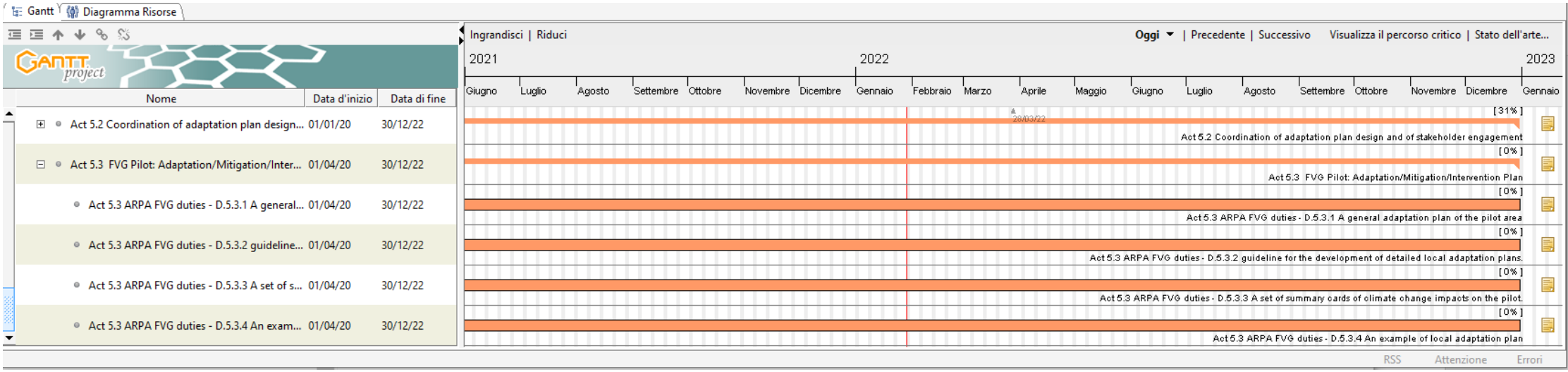
Implementation of the ARPA FVG Network Data Repository (home made or ERDDAP?)

Datasets available to be generated (Activities to do in 2022)

1. **Pilot Area** temperature, salinity, sea surface height fields from benchmark yearly simulation (selected set of SHYFEM model node hourly outputs for year 2018) netCDF, CF convention. . (2022 improvement)
2. **Pilot Area** temperature, salinity, sea surface height fields from MED-CORDEX scenarios up to 2100) netCDF, CF convention. (2022 deltas computation and perturbation for 3.)
3. **Pilot Area** temperature, salinity, sea surface height fields from sensitivity climate change cases yearly simulation (selected set of SHYFEM model node hourly outputs) + one long run simulation 2018-2050 [BC from AdriaClim basin scen RCP8.5] (hourly resolution) netCDF, CF convention. (2022 generation)
4. **Pilot Area** temperature, salinity, dissolved oxygen and chlorophyll measured profiles (2014-2021 monthly cruises) ASCII CSV files (2022 update continue)
5. **Pilot Area** macrozoobenthos measures (2008-2018 seasonal cruises) ASCII CSV files (2022 update continue)
6. **Pilot Area** meteorological measures (2000-2021 hourly records) ASCII CSV files (2022 update continue)

WP5 – azione 5.3 azioni di adattamento su area Pilota FVG

Le deliverable progettuali



D.5.3.1 A general adaptation plan or the pilot area reporting the bulk of the strategies with a template for the development of local adaptation plans (M30)

D.5.3.2 A guideline for the development of detailed local adaptation plans (M30)

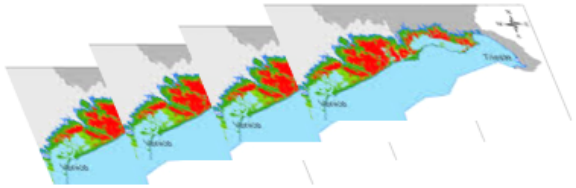
D.5.3.3 A set of summary cards of climate change impacts on the pilot (M30)

D.5.3.4 An example of local adaptation plan, e.g. for Trieste municipality or Trieste town (M30)

WP5 – azione 5.3 azioni di adattamento su area Pilota FVG

Approccio generale nella realizzazione delle deliverable progettuali per il WP 5.3

Comunità Tecnico-Scientifica



Interazione

Portatori di interesse e amministratori locali

Identificazione del rischio
Valutazione quantitativa del rischio
Soluzioni efficaci ed efficienti

Percezione del problema
Identificazione del problema
Proposte di soluzione

Azioni di risposta
(Piani di adattamento)

WP5 – azione 5.3 azioni di adattamento su area Pilota FVG

Svolta attività di avvicinamento dei portatori di interesse

13 May 2021

21 May 2021

04 June 2021

18 June 2021

Completed

- Mainly formation of stakeholders
- Sharing of needs of
- Communication of data that AdriaClim is going to produce in support to adaptation plans
- Sharing knowledge on Climate Change at Global and local level

CReIAMO PA

AREA SCIENCE PARK

UNIVERSITÀ DEGLI STUDI DI UDINE

hic sunt futura

UNIVERSITÀ DEGLI STUDI DI TRIESTE

Still in progress

WP5.3 – stato di avanzamento delle deliverable e attività 2022

Deliverable

D.5.3.1 A general adaptation plan of the pilot area reporting the bulk of the strategies with a template for the development of local adaptation plans (M30)

(defined the topics to be included – first draft)

D.5.3.2 A guideline for the development of detailed local adaptation plans. (M30)

(defined the topics to be included – first draft)

D.5.3.3 A set of summary cards of climate change impacts on the pilot. (M30)

(just a few ideas and notes)

D.5.3.4 An example of local adaptation plan (M30)

(selected some specific targets [stakeholders] – first draft)

Sintesi attività da svolgere nel 2022

- Individuazione di potenziali impatti e portatori di interesse su cui concentrare le attività (specie per D5.3.4)
- Acquisizione di un ulteriore collega dedicato completamente alle attività 5.3 (febbraio/marzo 2022)
- Acquisizione delle dotazioni informatiche necessarie alla risorsa umana che si aggiunge alla compagine
- Interazione con i pari (CreiamoPa, Area SP, Università) e con i portatori di interesse

CONTACT INFORMATION

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