croix-rouge française
PIROI
GESTION DES CATASTROPHES center

Annual regional disaster management workshop (2021)

Presentation of the PISSARO project

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PISSARO

Prévisions Intra-Saisonnières et Saisonnières avec AROme
Subseasonal and seasonal predictions with AROME

This project is mainly concerned with applications of **atmospheric and oceanic forecasting** so-called **subseasonal**, i.e. with time scales ranging from 2 weeks to 2 months, **for applications over the south-western Indian Ocean basin**.

The PISSARO project is a **collaborative project for the valorisation of research data**, developed and conducted in partnership with actors from La Réunion and Seychelles, over a period of 3 years (**2020-2023**).

PISSARO: Prévisions Intra-Saisonnières et Saisonnières avec AROme is co-funded by The European Union and Région Réunion

Project partners

Laboratoire de l'Atmosphère et des Cyclones (LACy) La Réunion, France

Academic research laboratory specialized in tropical meteorology

Belong to:

and an **international networks of experts** on S2S predictions

Direction InterRégionale de Météo-France pour l'Océan Indien (DIROI) La Réunion, France

Weather forecasting service operational in La Réunion and Mayotte and Regional Specialized Meteorological Centre for Tropical Cyclones of the South-Western Indian Ocean (SWIO) basin

Plateforme d'Intervention Régional de l'Océan Indien (PIROI) La Réunion, France

Regional intervention tool attached to the International Relations and Operations Directorate of the French Red Cross, with a vast disaster risk management programme in the SWIO.

Seychelles Meteorological Authority (SMA)

Weather forecasting service operational in Seychelles

What is subseasonal predictions?

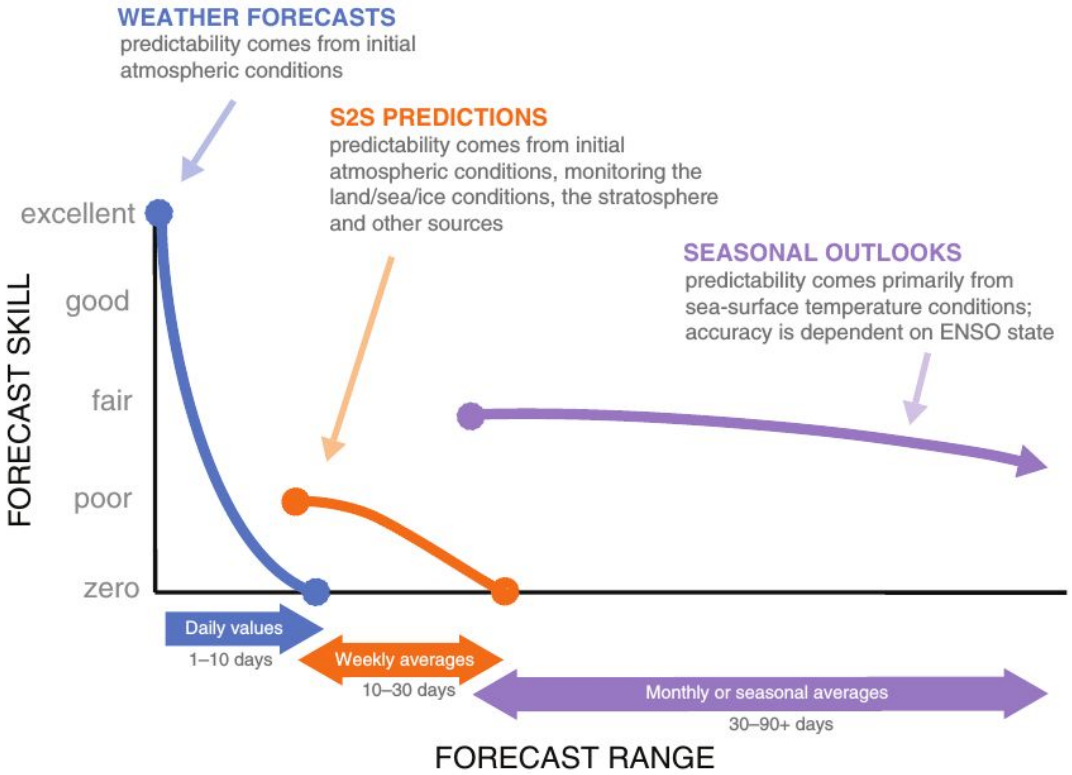


Figure 1. Qualitative estimate of forecast skill based on forecast range. Source : White et al. (2017).

Subseasonal predictions and Disaster Risk Reduction

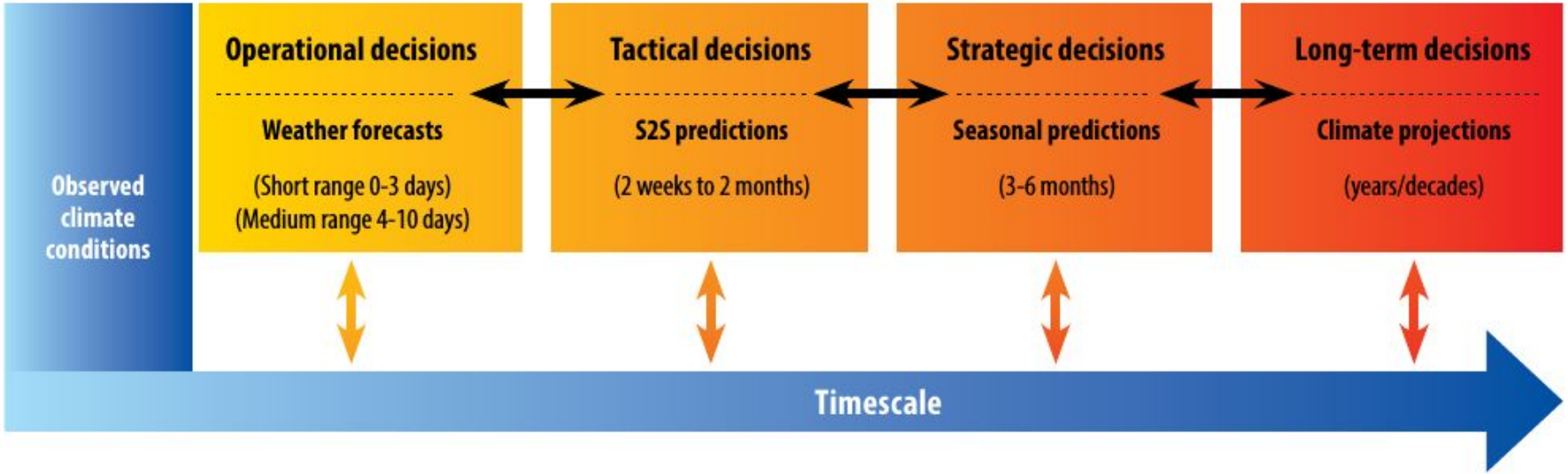


Figure 2. Disaster risk management interventions across the continuum of timescales of climate information. Source : UN report (2019), modified from ESCAP (2017).

The subseasonal forecast will be used as a missing link between the seasonal forecast and the medium-term weather forecast following the **"Ready-Set-Go" concept** proposed by the Red Cross Climate Centre and the IRI (Goddard et al., 2014).

S2S predictions database

The main objectives of the **S2S project** (established jointly by WWRP and WCRP) are the **evaluation, improvement and promotion of intraseasonal atmospheric and ocean forecasting** (http://s2sprediction.net).

Specific attention will be paid to the risk of extreme weather, including tropical cyclones, droughts, floods, heat waves and the waxing and waning of monsoon precipitation.

To achieve many of these goals, S2S project archives an extensive database of subseasonal forecasts (up to 60 days) and reforecasts. This represents **a database of up to 6 years of (almost real-time) forecasts and up to 25 years of reforecasts** of a variety of atmospheric and oceanic parameters produced by 11 **different forecasting models**.

PISSARO objectives on data evaluation

Evaluation of the S2S database on the prediction at weeks 2 to 4 of tropical cyclones and extreme precipitations for the SWIO

Situational replay to assess whether the additional data available in the S2S database **would have helped in better decision making**

Contribute to **the improvement of subseasonal forecasts in the SWIO basin**

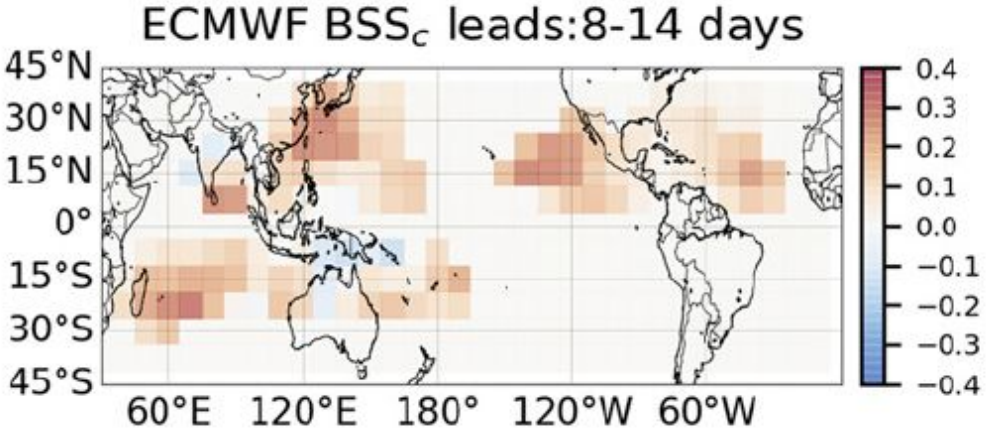


Figure 3. Map of ECMWF week-2 TC occurrence skill scores for the seasonal mean constant climatology. Source : Lee et al. (2020).

PISSARO objectives on forecast and risk products

Valorisation of S2S data through the **development of application-specific forecasting and risk assessment products**

1) Specification of risk and forecasting products for PIROI and other users (through DIROI and SMA).
2) Work in close collaboration with Météo-France for the development of risk products

Establishment of **a sustainable internet platform** for the supply of data products

Awareness raising and **training of users on subseasonal forecasting** and its specific applications for the SWIO region.

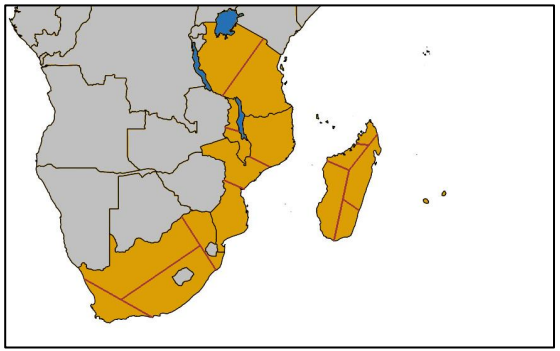


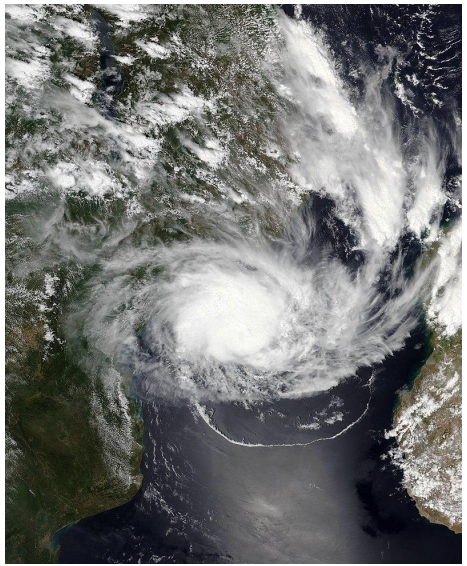
Figure 4. SWIO zoning for the development of forecasting and risk products.

Example of subseasonal forecast of tropical cyclones

CHALANE

19 dec. 2020 - 3 jan. 2021

Severe tropical storm



Source : NASA
https://worldview.earthdata.nasa.gov/

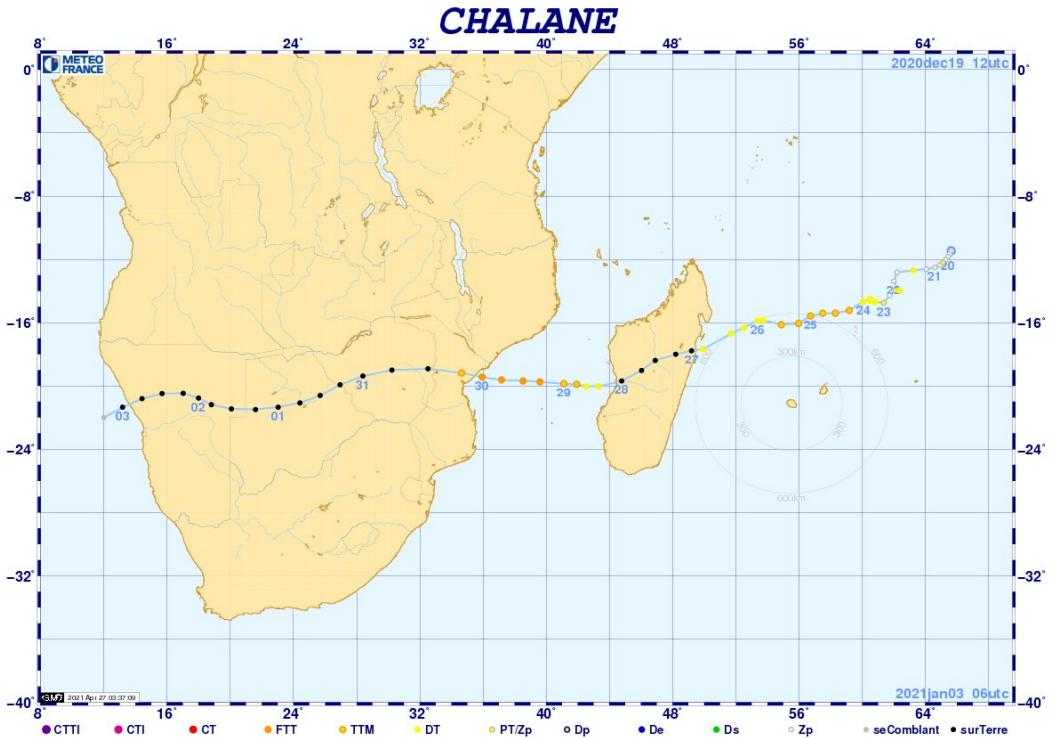
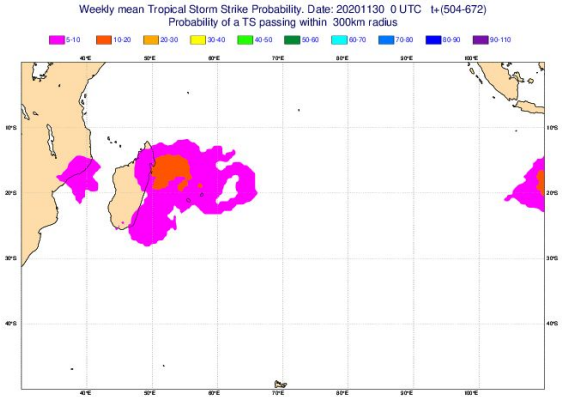


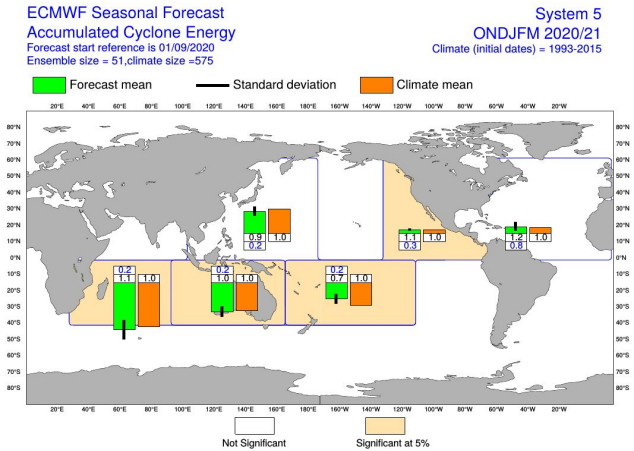
Figure 5. Trajectory (best-track). Source : Météo-France

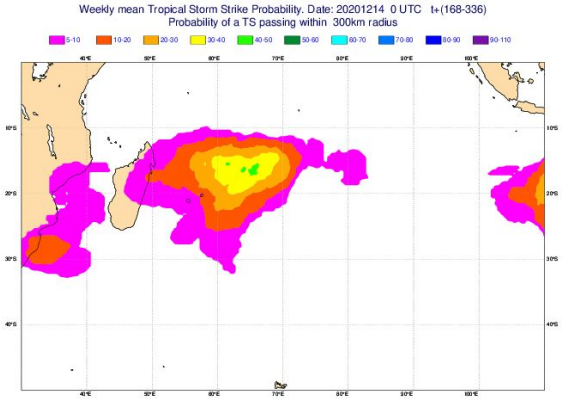
Example of subseasonal forecast of tropical cyclones



Set

Ready





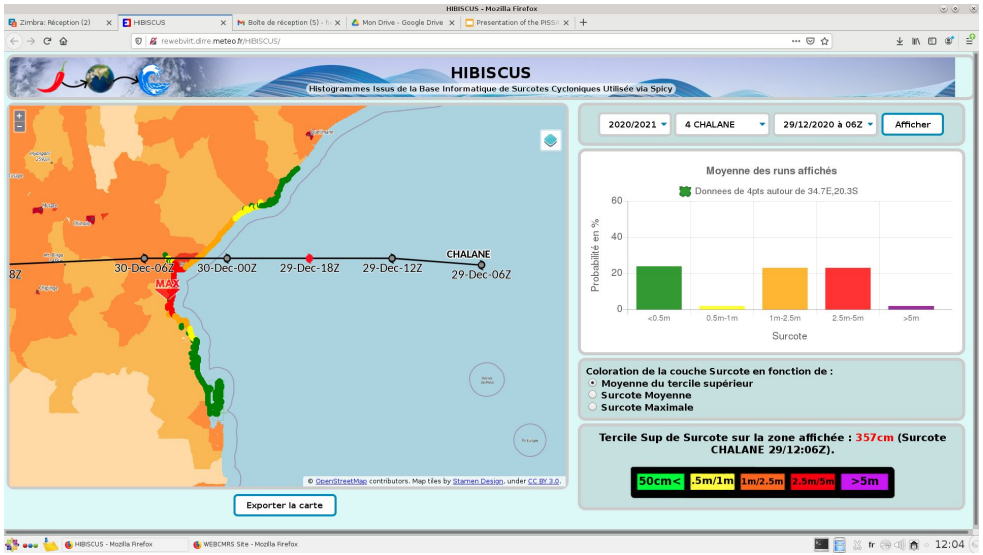
Go!

Figure 6. ECMWF forecast for 2020-2021 austral summer in septembre 2020 (Ready), for 21-28 dec. 2020 at 3 (Set) and 1 (Go!) weeks.

Example of risk products

There are many **hazard warning platforms** available online and there are **vigilance strategies** deployed by national weather services or dedicated institutions. But **these tools are short-range (0-3 days) and only a few are medium-range (3-7 days)**.

Example : HIBISCUS platform developed by Météo-France (DIROI)



The objective of PISSARO is **to adapt this type of product** on a subseasonal time scale by specifying **a probability of risk of tropical cyclone passage(s), heavy rainfall or other oceanic or meteorological situations** for different predefined areas.

Summary

PISSARO is **an academic research project** that started in October 2020 and will run until 2023.

The main approach is to study past data to :

-> **assess the quality of subseasonal forecasts** for tropical cyclones and weather regimes

-> **to develop user-friendly forecast products**

This project **focuses on the south-western Indian Ocean basin** which is often under-represented in global tools and whose specificities are not always taken into account.

There are few warning products for risk management beyond a few days. The ambition to deploy early warning tools cannot be achieved without **discussions between users and S2S experts** to define specifications and to assess the feasibility of the products

Thank you for your attention!

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How to contact us?

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