Forecasting extreme events in the southwest Indian Ocean on a monthly scale

Review of the cyclone hazard anticipation product for the 2021-2022 season
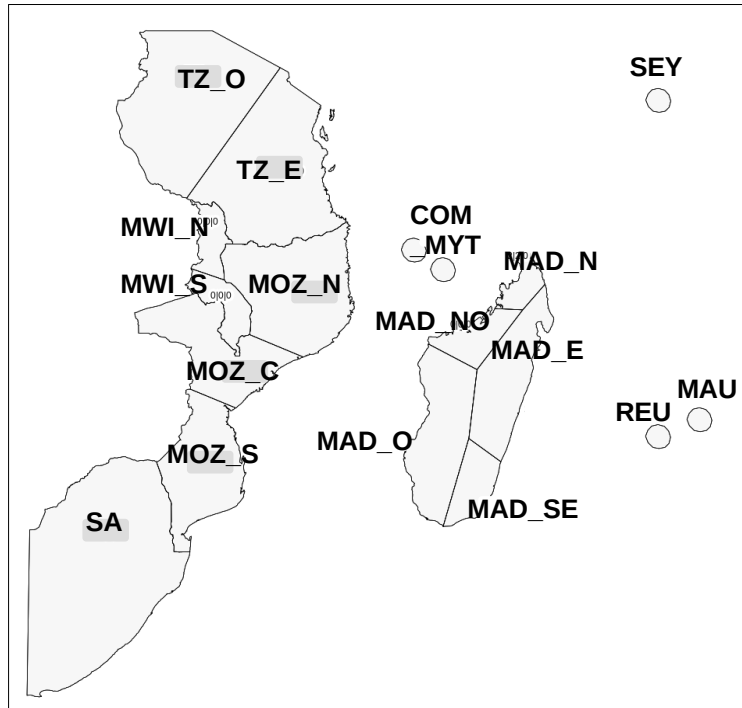
Hélène Vérèmes
Email: helene.veremes@univ-reunion.fr

The product

Cyclone hazard anticipation product for inhabited areas

of the southwest Indian Ocean

Produit d'Anticipation de l'aléa Cyclonique pour les Territoires habités

du Sud-Ouest de l'Océan Indien (PACT-SOOI)

Colour levels express an increasing degree of reliability of the cyclone signal

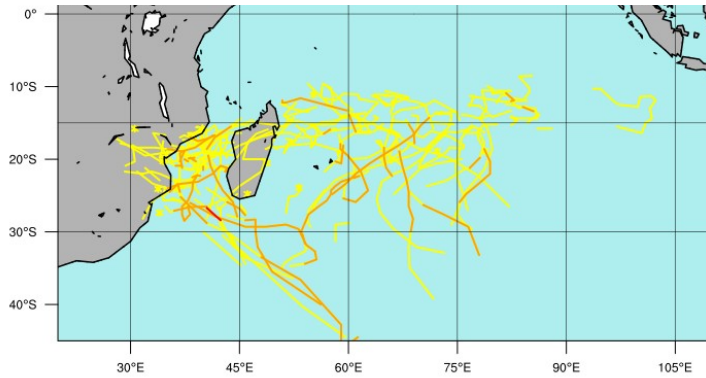Niveaux de couleur expriment un degré de fiabilité croissant du signal cyclonique

Time ranges:

Week 1 (W1) = D+7 to D+13

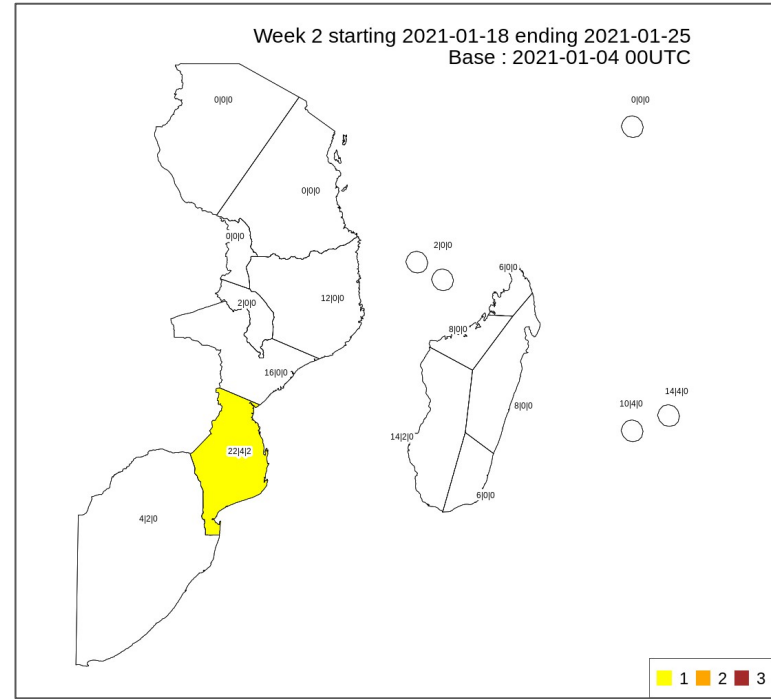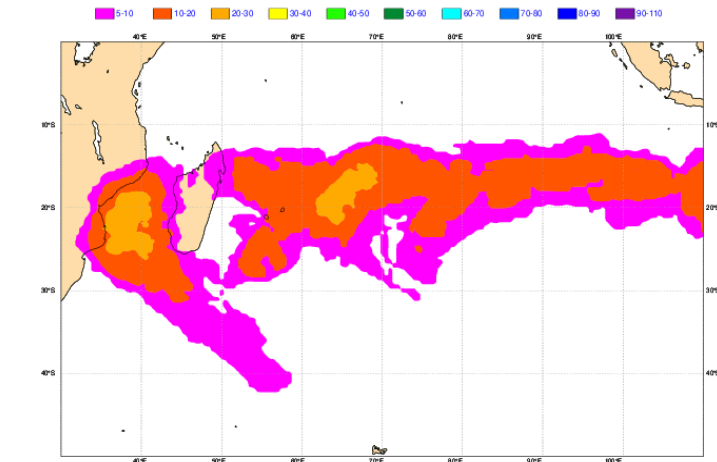Week 2 (W2) = D+14 to D+20

Week 3 (W3) = D+21 to D+27

Example of the product

New product developed within the framework of PISSARO (experimental)

**Cyclone hazard anticipation product for inhabited areas of the southwest Indian Ocean**

Put into production by F. Bonnardot

Week 2 starting 2021-01-18 ending 2021-01-25
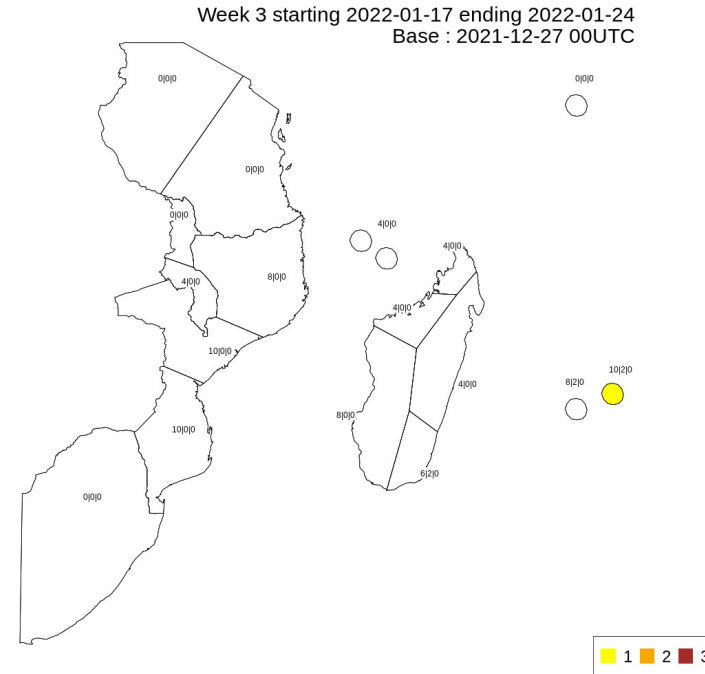Base : 2021-01-04 00UTC

ELOISE

The start of cyclone activity for the 2021-2022 season

No signal (any colours) for inhabited land before the run of 20 December for the week of 10 January

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast
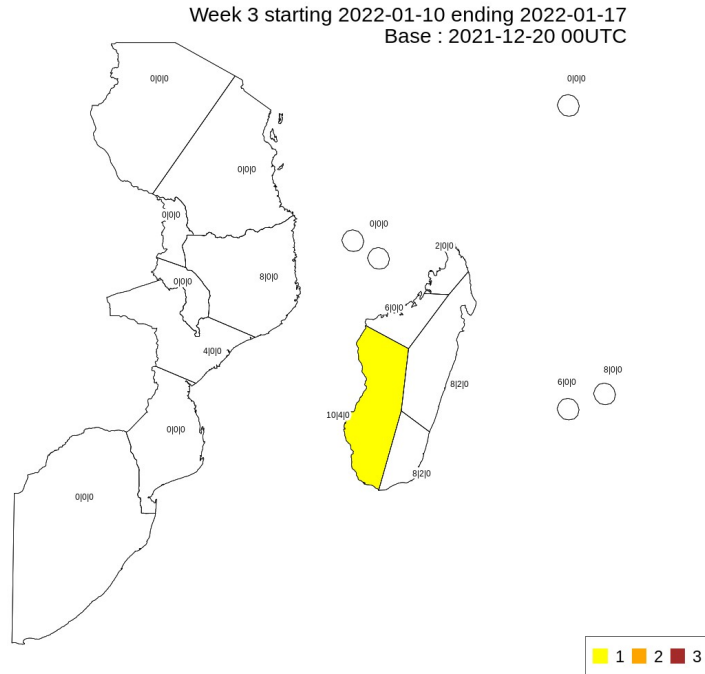
Week 3 starting 2022-01-10 ending 2022-01-17
Base : 2021-12-20 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 3 starting 2022-01-17 ending 2022-01-24
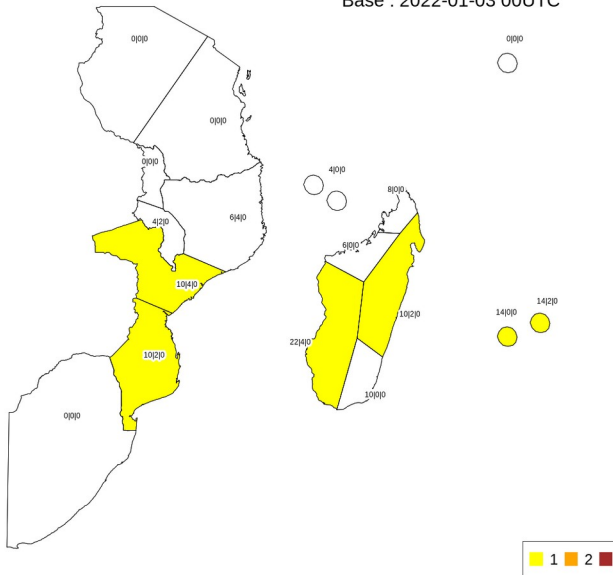Base : 2021-12-27 00UTC

The start of cyclone activity for the 2021-2022 season

Persistent (albeit yellow) signal from week to week from the run of 10 January for the week of 24-31 January
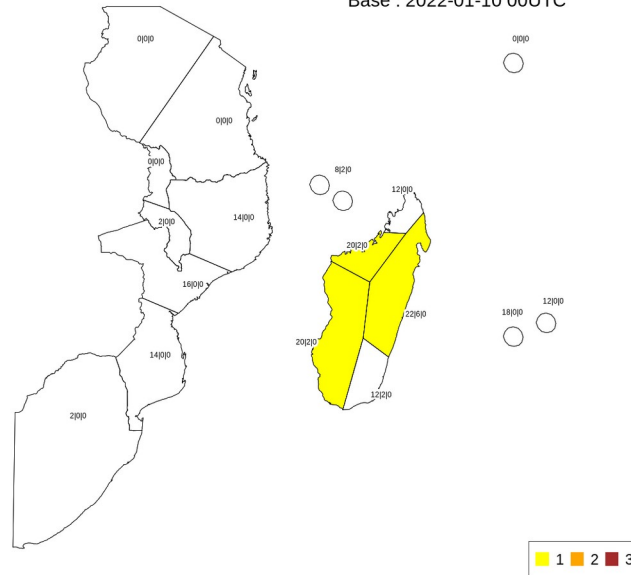

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

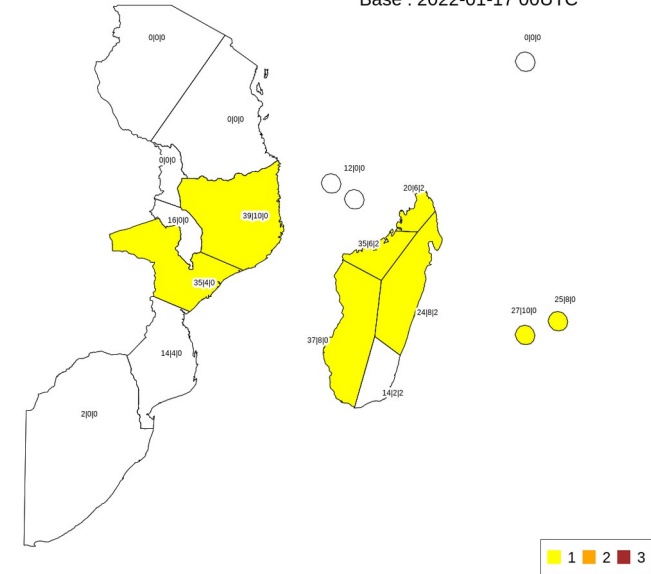Week 3 starting 2022-01-24 ending 2022-01-31
Base : 2022-01-03 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 2 starting 2022-01-24 ending 2022-01-31
Base : 2022-01-10 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 1 starting 2022-01-24 ending 2022-01-31
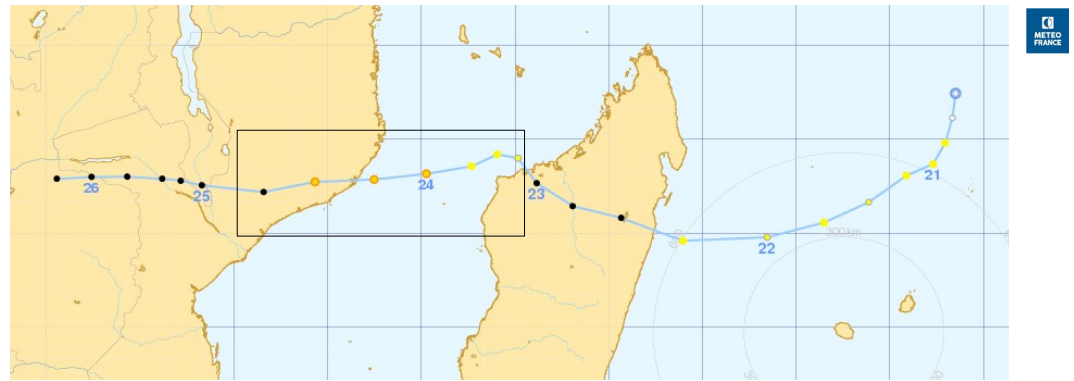Base : 2022-01-17 00UTC

Observation of the start of the season

1st system on 17 Jan week - 1st tropical storm (ANA) on the 24 January week - 1st impact on land on the 24 January week
Signal consistent with start of season but just infomative (yellow colour) for the user as yellow level

ANA (20 to 26 Jan. 2022)

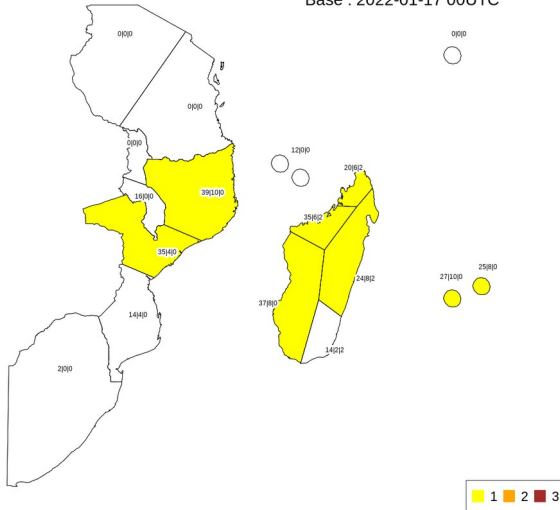[At least storme stage: 24/01 00UTC - 24/01 12UTC]
[Potential impacts: yes]

Tropical Cyclone Risk assessment
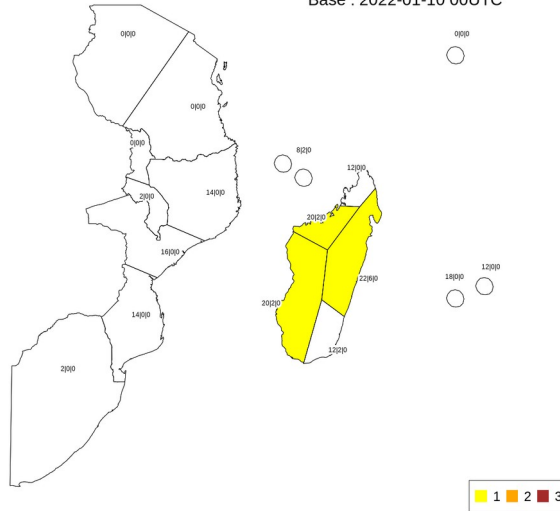based on ECMWF monthly extended forecast

Week 1 starting 2022-01-24 ending 2022-01-31
Base : 2022-01-17 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 2 starting 2022-01-24 ending 2022-01-31
Base : 2022-01-10 00UTC

Tropical Cyclone Risk assessment
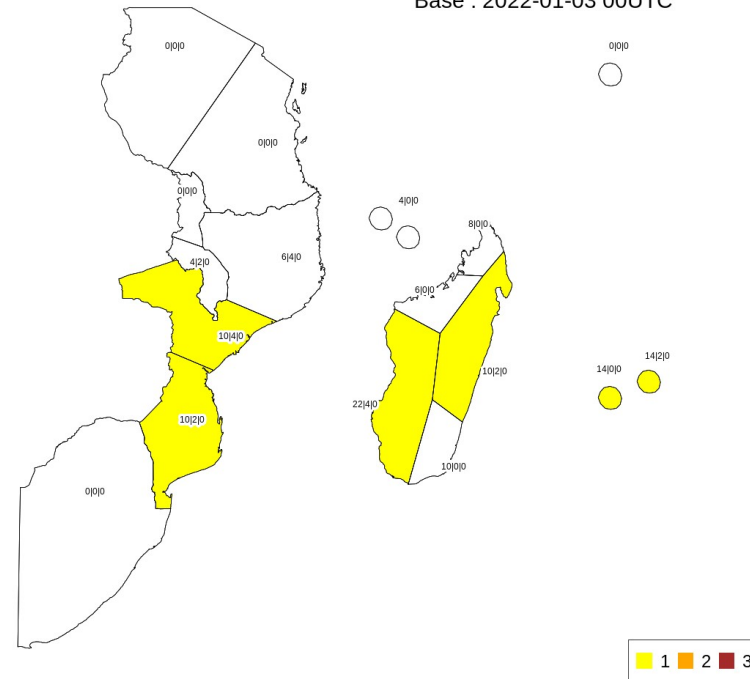based on ECMWF monthly extended forecast

Week 3 starting 2022-01-24 ending 2022-01-31
Base : 2022-01-03 00UTC
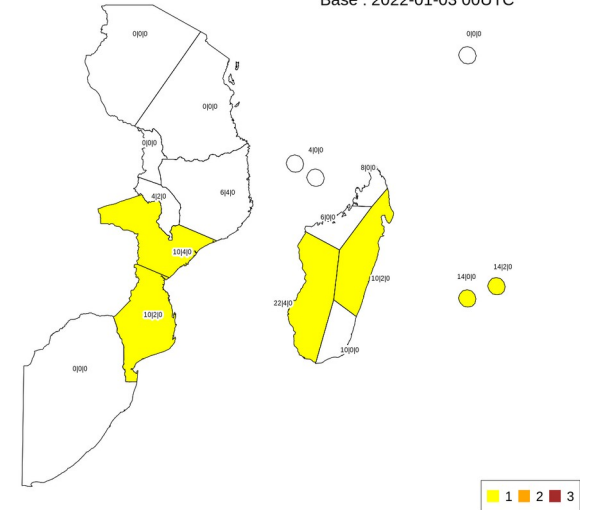
**Matching (with early signal on
Reunion / Mauritius from BATSIRAI)**

ANA (20 to 26 Jan. 2022)

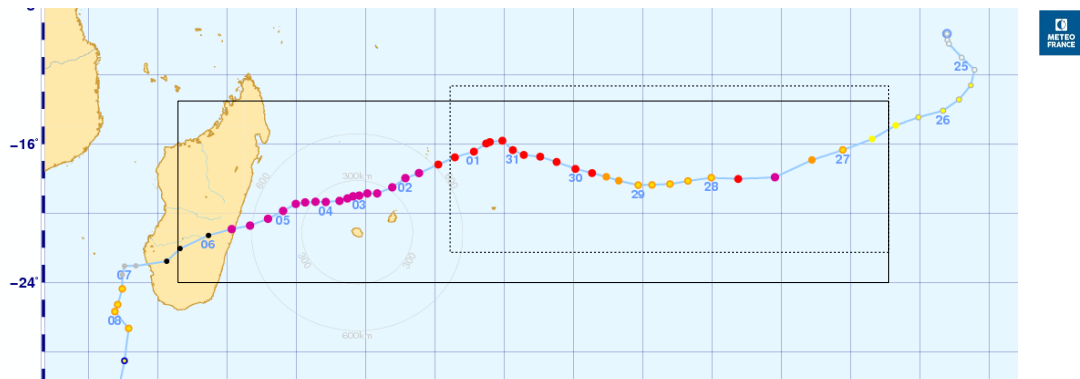[At least storme stage: 24/01 00UTC - 24/01 12UTC]
[Potential impacts: yes]

BATSIRAI (24 Jan. to 10 Feb. 2022)

[At least storm stage: 27/01 00UTC - 05/02 18UTC][Potential impacts: yes]

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 3 starting 2022-01-24 ending 2022-01-31
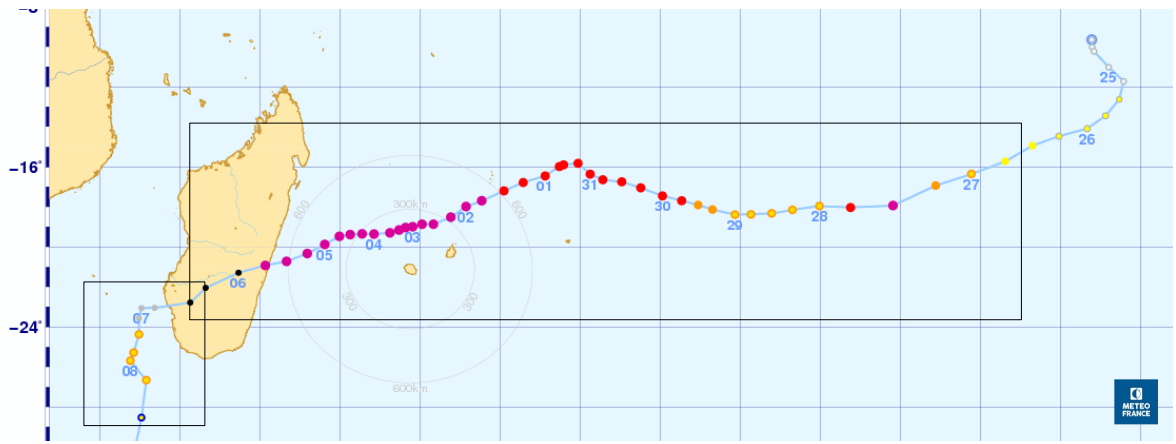Base : 2022-01-03 00UTC

Matching (when considering early signal on Reunion / Mauritius from BATSIRAI)

BATSIRAI (24 Jan. to 10 Feb. 2022)

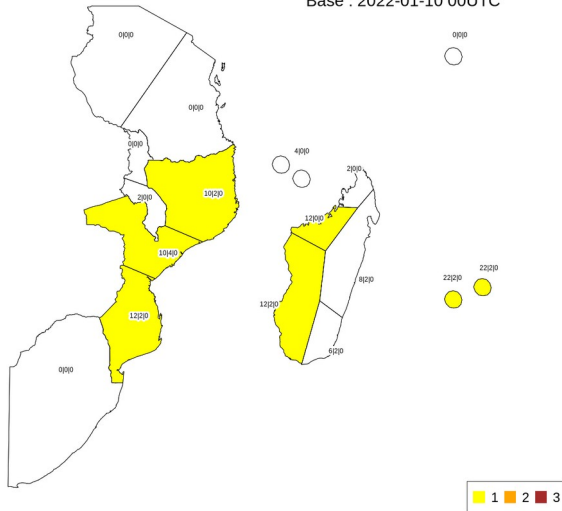[At least storm stage: 27/01 00UTC - 05/02 18UTC]
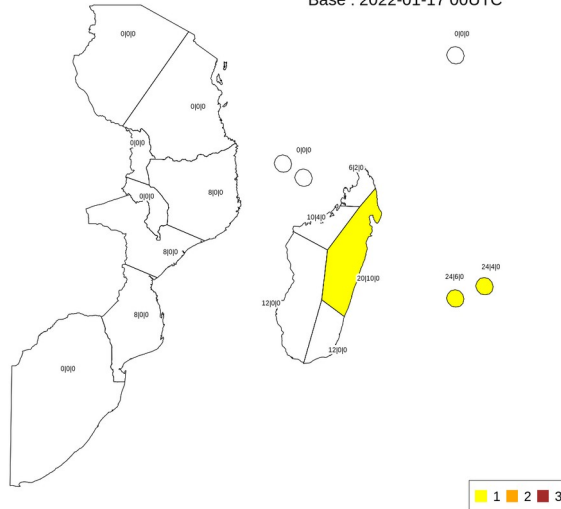[At least storm stage: 07/02 12UTC - 08/02 06UTC]
[Potential impacts: yes]

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

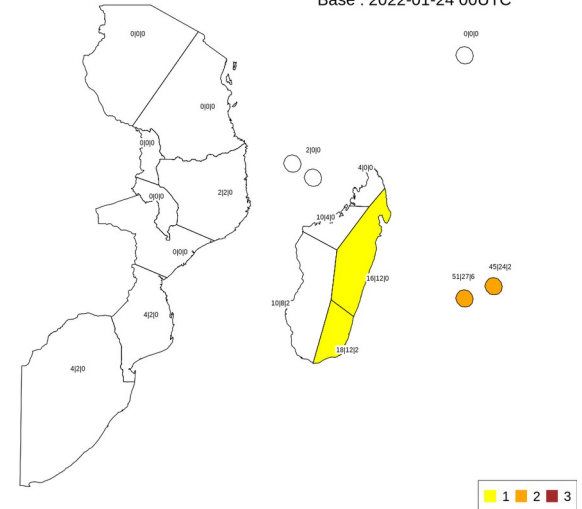Week 3 starting 2022-01-31 ending 2022-02-07
Base : 2022-01-10 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 2 starting 2022-01-31 ending 2022-02-07
Base : 2022-01-17 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 1 starting 2022-01-31 ending 2022-02-07
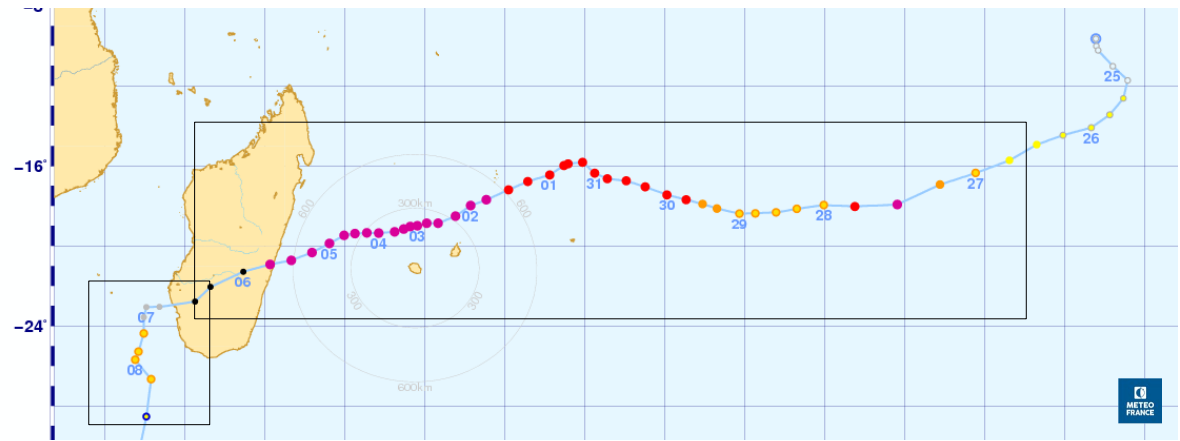Base : 2022-01-24 00UTC

Matching

BATSIRAI (24 Jan. to 10 Feb. 2022)

[At least storm stage: 27/01 00UTC - 05/02 18UTC]
[At least storm stage: 07/02 12UTC - 08/02 06UTC]
[Potential impacts: yes]

Tropical Cyclone Risk assessment
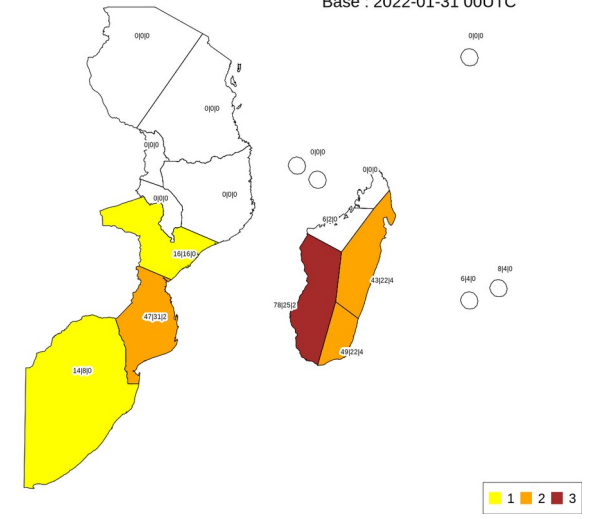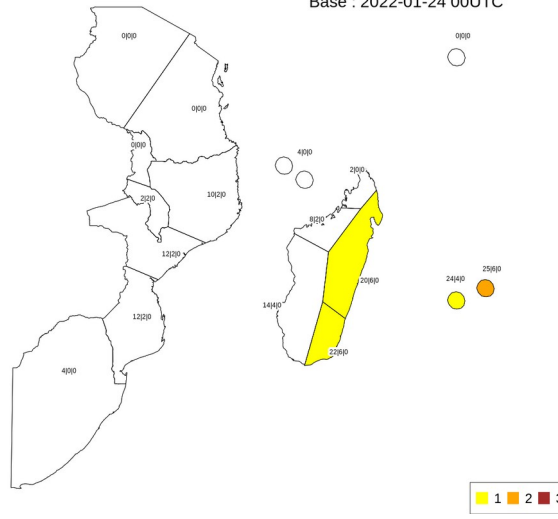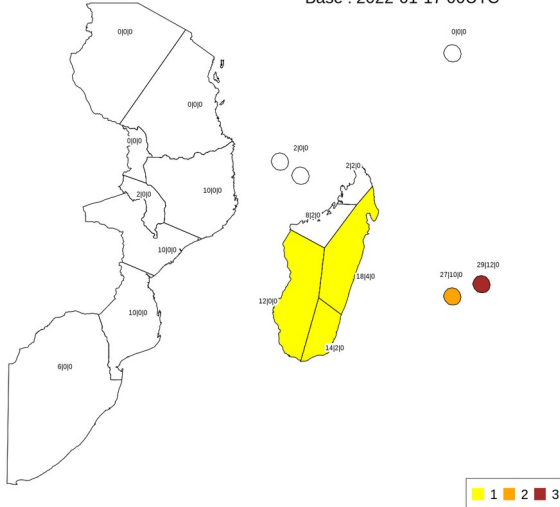based on ECMWF monthly extended forecast

Week 3 starting 2022-02-07 ending 2022-02-14
Base : 2022-01-17 00UTC

**Could match (for DUMAKO, limit
of the 300 km radius and date)**

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 2 starting 2022-02-07 ending 2022-02-14
Base : 2022-01-24 00UTC

**Idem but no signal of BATSIRAI
In the Mozambique Channel**

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 1 starting 2022-02-07 ending 2022-02-14
Base : 2022-01-31 00UTC

**Matching for Madagascar
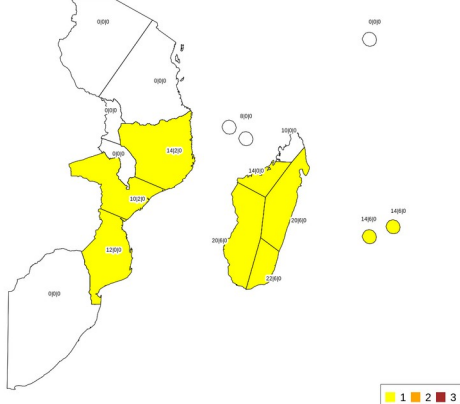But wrong on Mozambique**

EMNATI (15 to 27 Feb. 2022)

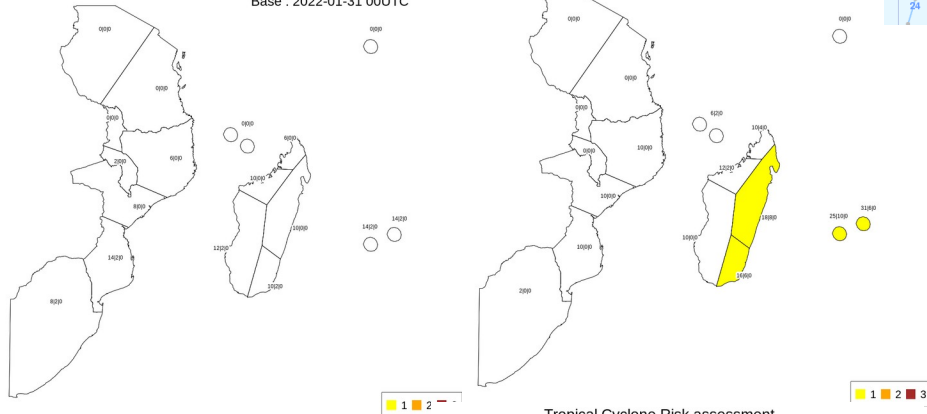[At least storm stage: 17/02 00UTC - 23/02 00UTC][Potential impacts: yes]
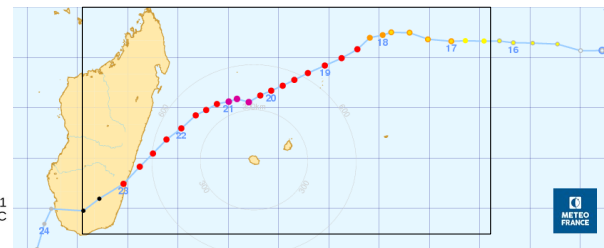
Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

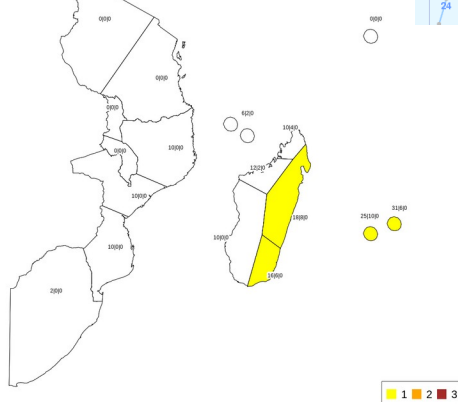Week 3 starting 2022-02-14 ending 2022-02-21
Base : 2022-01-24 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 2 starting 2022-02-14 ending 2022-02-21
Base : 2022-01-31 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 1 starting 2022-02-14 ending 2022-02-21
Base : 2022-02-07 00UTC

**Matching (DUMAKO for
Madagascar And EMNATI
for Reunion and Mauritius)**

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 3 starting 2022-02-21 ending 2022-02-28
Base : 2022-01-31 00UTC

Tropical Cyclone Risk assessment
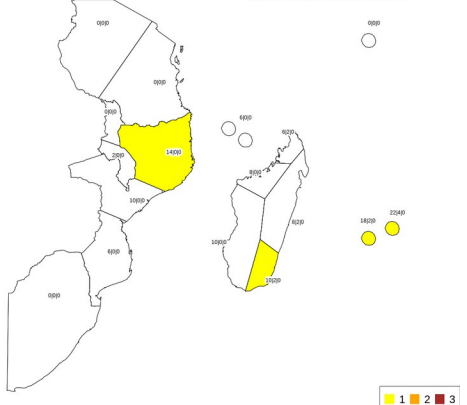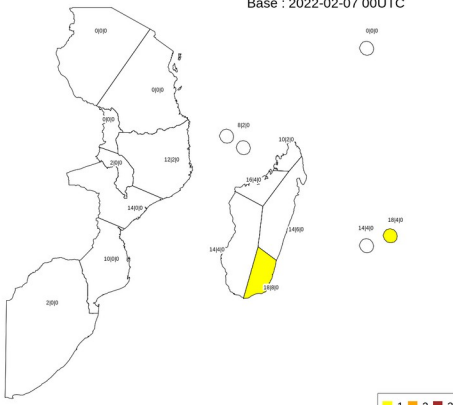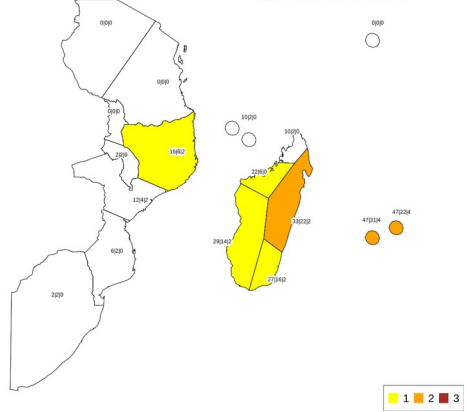based on ECMWF monthly extended forecast

Week 2 starting 2022-02-21 ending 2022-02-28
Base : 2022-02-07 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

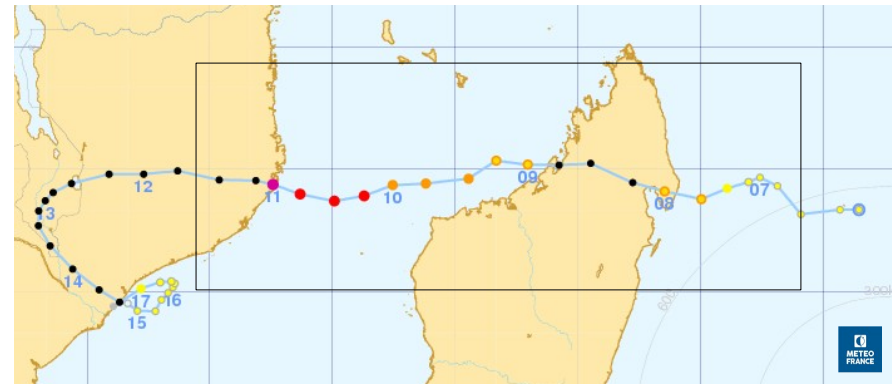Week 1 starting 2022-02-21 ending 2022-02-28
Base : 2022-02-14 00UTC

**Matching for orange zone
But in the limit of the 300 km
Distance, wrong for Mozambique**

PISSARO experimental cyclone hazard anticipation product, review for 2021-2022 | H. Vérèmes | 10
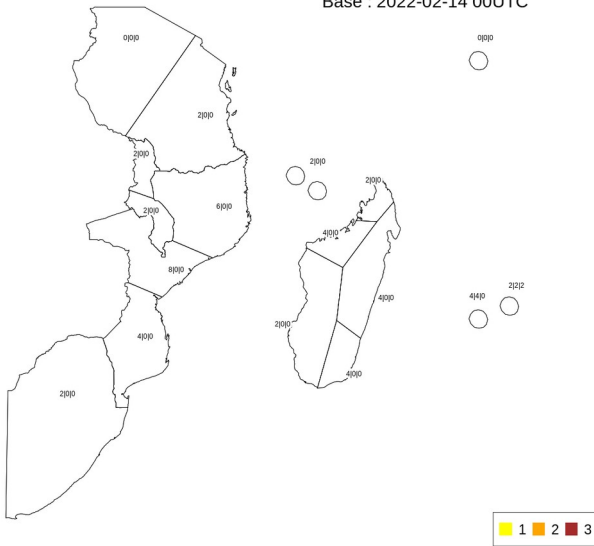
GOMBE (6 to 17 March 2022)

[At least storm stage: 09/03 00UTC - 11/03 00UTC][Potential impacts: yes]
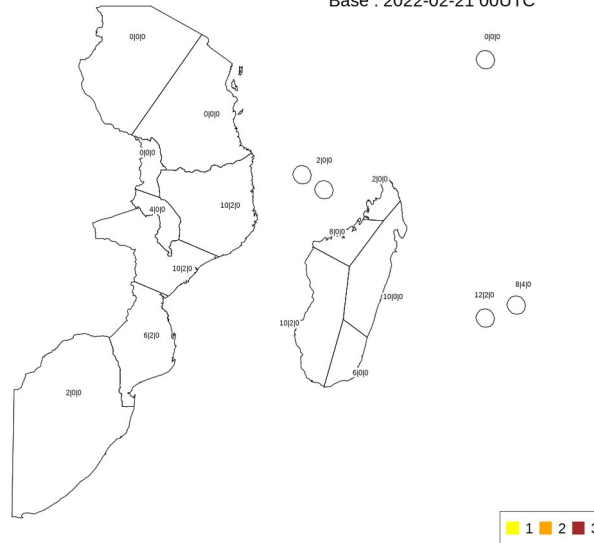

Missed

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 3 starting 2022-03-07 ending 2022-03-14
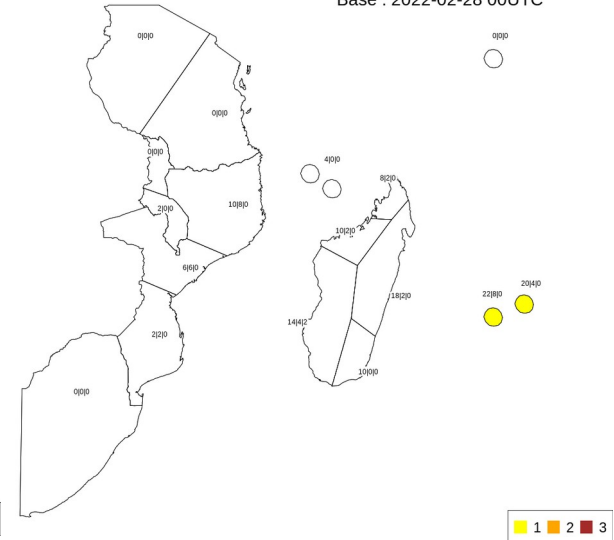Base : 2022-02-14 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 2 starting 2022-03-07 ending 2022-03-14
Base : 2022-02-21 00UTC

Tropical Cyclone Risk assessment
based on ECMWF monthly extended forecast

Week 1 starting 2022-03-07 ending 2022-03-14
Base : 2022-02-28 00UTC

Remarks

Summary

- Signal on the TCs of the most intense part of the season, less prediction at the end

- Only 3 predictions with level 2 alert (W1;W2) and 2 predictions with level 3 alert (W1;W3)

- Good signal of the effective start of the cyclonic season

Outlooks

- Needs to calculate scores by comparing with the BT

  → espacially for cyclonic episods with impacts (database being updated by E. Clerissi)

- Difficulty in doing a situational replay

  → test of the product in operational conditions. Next season? How? (internship of E. Clerissi)