



މާލdives ދިވެހިރާއްޖޭގެ ފުލުވުމުގެ ސަރުކާރު

MALDIVES METEOROLOGICAL SERVICE



2022

ANNUAL REPORT



اړیکه مخینه

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- 4..... ډیټا بڼه
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- 5..... د ډیټا بڼې د ډیټا بڼې د سرچینو لیکل
- 5..... د ډیټا بڼې د سرچینو لیکل
- 5..... 2022 وروسته د ډیټا بڼې د سرچینو لیکل
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- **የገንዘብ ማጠቃለያ ሪፖርት:** የገንዘብ ማጠቃለያ ሪፖርት
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كوبه اردو

"بھائی کی اہلیہ کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے، نہ بھائی کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے، نہ بھائی کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے، نہ بھائی کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے، نہ بھائی کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے"

اردع

"بھائی کی سوتیلی ماں کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے، نہ بھائی کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے، نہ بھائی کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے، نہ بھائی کو بھائی کے ارادے میں نہ بھگا کر رکھنا ہے"

2022 وىسىز ئارىلىقى تىزىمى

۱. تاشقۇن

2022 ۱7 ئاينىڭ 17	33.7°C	ۋىسىز ئارىلىقى تىزىمى
2022 2 ئاينىڭ 2	22.5°C	ۋىسىز ئارىلىقى تىزىمى
2022 16 ئاينىڭ 16 2332 نىڭ	ۋىسىز ئارىلىقى تىزىمى 54 نىڭ	ۋىسىز ئارىلىقى تىزىمى
2022 17 ئاينىڭ 17	139.6 جۈجۈپەس	ۋىسىز ئارىلىقى تىزىمى

۲. تاشقۇن

2022 30 ئاينىڭ 30 2 ئاينىڭ 2	33.8°C	ۋىسىز ئارىلىقى تىزىمى
2022 5 ئاينىڭ 5	21.6°C	ۋىسىز ئارىلىقى تىزىمى
2022 2 ئاينىڭ 2 0905 نىڭ	ۋىسىز ئارىلىقى تىزىمى 49 نىڭ	ۋىسىز ئارىلىقى تىزىمى
2022 16 ئاينىڭ 16	100.8 جۈجۈپەس	ۋىسىز ئارىلىقى تىزىمى

۳. تاشقۇن

2022 24 ئاينىڭ 24	33.8°C	ۋىسىز ئارىلىقى تىزىمى
2022 3 ئاينىڭ 3	22.6°C	ۋىسىز ئارىلىقى تىزىمى
2022 22 ئاينىڭ 22 0555 نىڭ	ۋىسىز ئارىلىقى تىزىمى 44 نىڭ	ۋىسىز ئارىلىقى تىزىمى
2022 30 ئاينىڭ 30	120.5 جۈجۈپەس	ۋىسىز ئارىلىقى تىزىمى

۴. تاشقۇن

2022 26 ئاينىڭ 26 7 ئاينىڭ 7	32.8°C	ۋىسىز ئارىلىقى تىزىمى
2022 25 ئاينىڭ 25	21.6°C	ۋىسىز ئارىلىقى تىزىمى
2022 21 ئاينىڭ 21 0021 نىڭ	ۋىسىز ئارىلىقى تىزىمى 41 نىڭ	ۋىسىز ئارىلىقى تىزىمى
2022 3 ئاينىڭ 3	124.8 جۈجۈپەس	ۋىسىز ئارىلىقى تىزىمى

۵. تاشقۇن

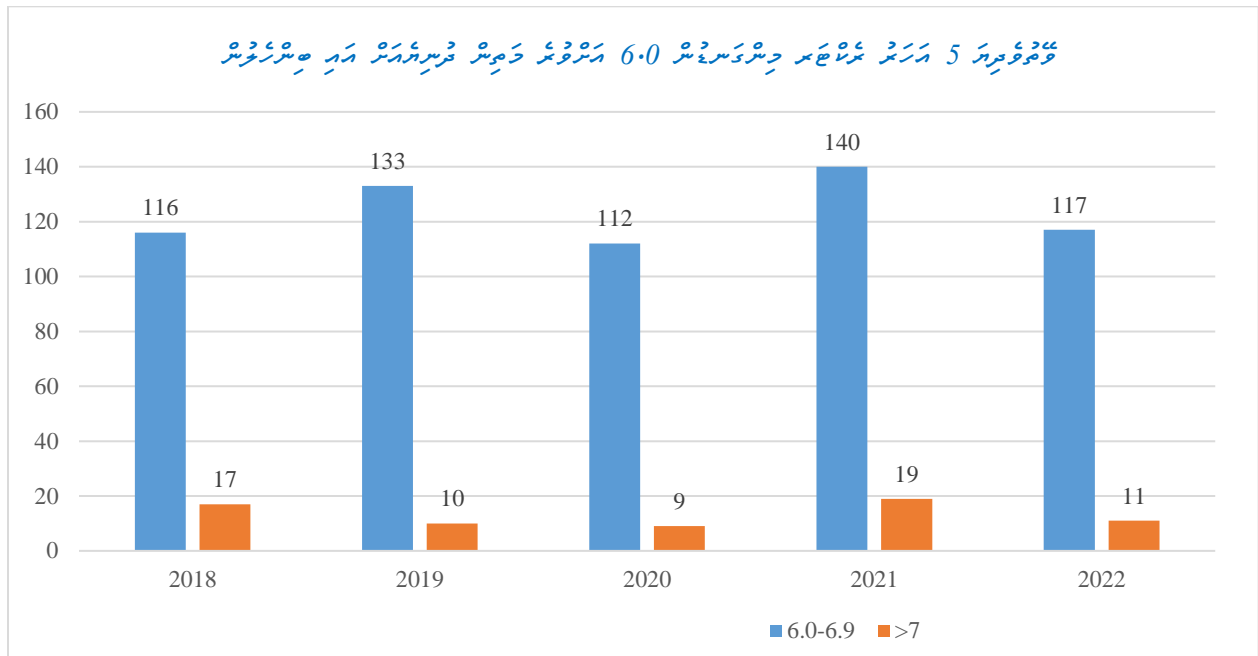
2022 14 ئاينىڭ 14	33.4°C	ۋىسىز ئارىلىقى تىزىمى
2022 3 ئاينىڭ 3	21.6°C	ۋىسىز ئارىلىقى تىزىمى
2022 4 ئاينىڭ 4 1421 نىڭ	ۋىسىز ئارىلىقى تىزىمى 47 نىڭ	ۋىسىز ئارىلىقى تىزىمى
2022 21 ئاينىڭ 21	73.2 جۈجۈپەس	ۋىسىز ئارىلىقى تىزىمى

- 2022 ۆسەرلرئىر ئىسسىق ئۆلچىمى ئۆزگىرىشى: 8 ئايدا 2022
- 2022 ۆسەرلرئىر ئىسسىق ئۆلچىمى ئۆزگىرىشى: 31 ئىسسىق 2022

2022 ۆسەرلرئىر ئىسسىق ئۆلچىمى

2021-2018 ۆسەرلرئىر ئىسسىق ئۆلچىمى ئۆزگىرىشى 6.0 ئىسسىق ئۆلچىمى ئۆزگىرىشى ئىسسىق ئۆلچىمى

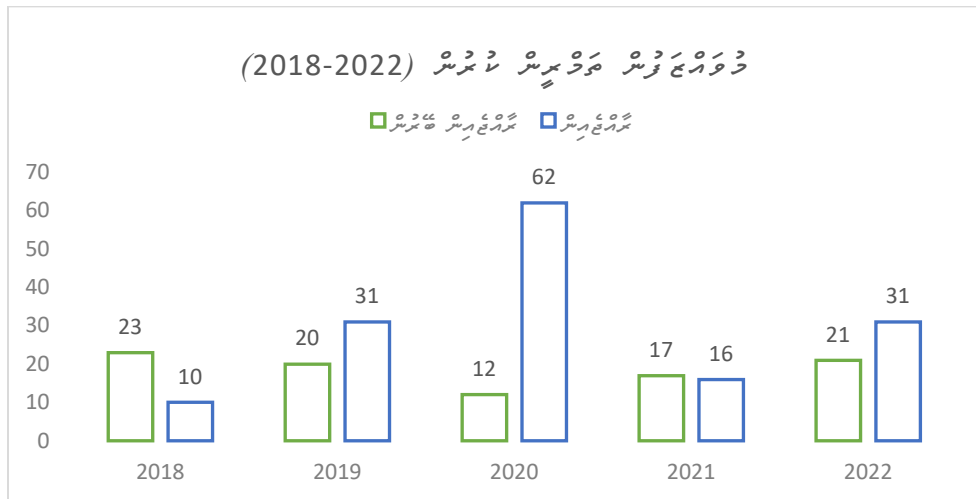
117	2022 ۆسەرلرئىر ئىسسىق ئۆلچىمى ئۆزگىرىشى 6.0 ئىسسىق ئۆلچىمى ئۆزگىرىشى 6.9 ئىسسىق ئۆلچىمى ئۆزگىرىشى ئىسسىق ئۆلچىمى
11	2022 ۆسەرلرئىر ئىسسىق ئۆلچىمى ئۆزگىرىشى 7.0 ئىسسىق ئۆلچىمى ئۆزگىرىشى 7.0 ئىسسىق ئۆلچىمى ئۆزگىرىشى ئىسسىق ئۆلچىمى
0	2022 ۆسەرلرئىر ئىسسىق ئۆلچىمى ئۆزگىرىشى 0 ئىسسىق ئۆلچىمى ئۆزگىرىشى ئىسسىق ئۆلچىمى



ۆزگىرىشى ئىسسىق ئۆلچىمى ئۆزگىرىشى: (USGS & SiescomP3-MMS)

دوره های جشنواره مسابقات علمی

- در این دوره ها به منظور ارتقای سطح علمی و پژوهشی دانش آموزان و همچنین به منظور معرفی دستاوردهای علمی و پژوهشی دانش آموزان در سطح ملی و بین المللی، مسابقات علمی و پژوهشی در سطوح مختلف برگزار می شود.
- در این دوره ها به منظور ارتقای سطح علمی و پژوهشی دانش آموزان و همچنین به منظور معرفی دستاوردهای علمی و پژوهشی دانش آموزان در سطح ملی و بین المللی، مسابقات علمی و پژوهشی در سطوح مختلف برگزار می شود.
- در این دوره ها به منظور ارتقای سطح علمی و پژوهشی دانش آموزان و همچنین به منظور معرفی دستاوردهای علمی و پژوهشی دانش آموزان در سطح ملی و بین المللی، مسابقات علمی و پژوهشی در سطوح مختلف برگزار می شود.



تاریخ	موضوع	شرح
15 خرداد 1399	بسم الله الرحمن الرحيم بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ	تعمیر و بازسازی ساختمان
27 خرداد 1399 3 اردیبهشت 1400	بسم الله الرحمن الرحيم بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ	تعمیر و بازسازی ساختمان
28 خرداد 1399 3 اردیبهشت 1400	تعمیر و بازسازی ساختمان	HR
16 اردیبهشت 1400 17 اردیبهشت 1400	بسم الله الرحمن الرحيم بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ	تعمیر و بازسازی ساختمان
23 اردیبهشت 1400	تعمیر و بازسازی ساختمان	تعمیر و بازسازی ساختمان
30 اردیبهشت 1400 31 اردیبهشت 1400	تعمیر و بازسازی ساختمان	تعمیر و بازسازی ساختمان
12 شهریور 1400 22 شهریور 1400	تعمیر و بازسازی ساختمان	ANS
13 شهریور 1400 15 شهریور 1400	تعمیر و بازسازی ساختمان	تعمیر و بازسازی ساختمان
20 شهریور 1400 25 شهریور 1400	تعمیر و بازسازی ساختمان	NEO

15 16 2022 15 16 2022	15 16 2022 15 16 2022	15 16 2022 15 16 2022	15 16 2022 15 16 2022	15 16 2022 15 16 2022
16-15 2022 16-15 2022	16-15 2022 16-15 2022	16-15 2022 16-15 2022	16-15 2022 16-15 2022	16-15 2022 16-15 2022
1 2022 1 2022	1 2022 1 2022	1 2022 1 2022	1 2022 1 2022	1 2022 1 2022
20 2022 22 2022 2022 2022	20 2022 22 2022 2022 2022	20 2022 22 2022 2022 2022	20 2022 22 2022 2022 2022	20 2022 22 2022 2022 2022
26 2022 26 2022	26 2022 26 2022	26 2022 26 2022	26 2022 26 2022	26 2022 26 2022
23 2022 23 2022	23 2022 23 2022	23 2022 23 2022	23 2022 23 2022	23 2022 23 2022
28 2022 28 2022	28 2022 28 2022	28 2022 28 2022	28 2022 28 2022	28 2022 28 2022
30 2022 30 2022	30 2022 30 2022	30 2022 30 2022	30 2022 30 2022	30 2022 30 2022
22 2022 22 2022	22 2022 22 2022	22 2022 22 2022	22 2022 22 2022	22 2022 22 2022
23 2022 23 2022	23 2022 23 2022	23 2022 23 2022	23 2022 23 2022	23 2022 23 2022
24 2022 24 2022	24 2022 24 2022	24 2022 24 2022	24 2022 24 2022	24 2022 24 2022
27 2022 27 2022	27 2022 27 2022	27 2022 27 2022	27 2022 27 2022	27 2022 27 2022
18 2022 18 2022	18 2022 18 2022	18 2022 18 2022	18 2022 18 2022	18 2022 18 2022

سازمان هواپیمایی کشوری جمهوری اسلامی ایران

تاریخ برگزاری	موضوع	مکان برگزاری
20 شهریور 1399	اجرای پروازهای مسافربری	تهران
23 شهریور 1399	اجرای پروازهای مسافربری	تهران
28 شهریور 1399	اجرای پروازهای مسافربری	تهران
30 شهریور 1399	اجرای پروازهای مسافربری	تهران
1 آبان 1399	اجرای پروازهای مسافربری	تهران
26 آبان 1399	اجرای پروازهای مسافربری	تهران
29 آبان 1399	اجرای پروازهای مسافربری	تهران
30 آبان 1399	اجرای پروازهای مسافربری	تهران
2 آذر 1399	اجرای پروازهای مسافربری	تهران
4 آذر 1399	اجرای پروازهای مسافربری	تهران
8 آذر 1399	اجرای پروازهای مسافربری	تهران
10 آذر 1399	اجرای پروازهای مسافربری	تهران
11 آذر 1399	اجرای پروازهای مسافربری	تهران
12 آذر 1399	اجرای پروازهای مسافربری	تهران

גירסאות חדשות של הסכם שיתוף פעולה בין ישראל ורשות המבחן, נחתמו ב-17 באוגוסט 2022. הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר.

הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר. הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר. הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר.

גירסאות חדשות של הסכם שיתוף פעולה בין ישראל ורשות המבחן, נחתמו ב-28 באוגוסט 2022. הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר.

שיתוף מידע בין ישראל ורשות המבחן

הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר. הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר.

הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר. הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר.

הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר. הסכם זה יאפשר לרשות המבחן להשתמש במידע מרשמי ממשלתי לצורך מעקב אחר איומים בסייבר.



Maldives Meteorological Service

SEVERE WEATHER REPORT 2022

This report consists of significant weather events that occurred during the year 2022, primarily including the data of heavy rainfall and gust wind with severe weather-related information and pictures.

Meteorological Watch office
Maldives Meteorological Service
15 January 2023

Highlights of Weather Records during the year 2022

- Heaviest rainfall recorded for the year was 140 millimeters, which was recorded at the National Meteorological Center, Hulhule' on 17 July 2022.
- Highest maximum wind speed of 54 miles per hour was recorded at the recorded at the National Meteorological Center, Hulhule' on 16 May 2022 .
- Highest Maximum temperature was 33.8 degree Celsius, recorded at the Meteorological Office HDh.Hanimaadhoo on 30 April and 2nd May, and Meteorological Office L.Kadhdhoo on 24 April 2022.
- Lowest Minimum temperature was 21.6 degree Celsius, recorded at Meteorological Office Hanimaadhoo, Kaadedhdhoo and Gan on 5th Feb, 25th Aug and 3rd Aug 2022 respectively.
- Onset of southwest monsoon was declared on 8th May 2022 over southern atolls and 12th May 2022 for central and northern atolls.
- Northeast monsoon was declared on 31st December 2022.

JANUARY

The first week of the month was observed to be windy over central and parts of north area. This was due to the formation of a low-pressure area over southwest Bay of Bengal with embedded cyclonic circulation off the coast of Sri Lanka. Surface winds of 15 – 25 miles per hour was experienced in central atolls with rough seas. On 2nd and 3rd of January another Low-pressure area was formed over southwest of Maldives which caused wind convergence over southern and central atolls. Due to this, scattered showers and thunderstorm was experienced in southern atolls on 4th January. Isolated showers occurred over southern atolls for three more days but after that mainly fine weather prevailed over Maldives until mid-January. On 16th showers were experienced in southernmost atolls. This was as a result of the line of convergence south of the Maldives, which gave rise to intense convective clouds over the area (Fig. 1).

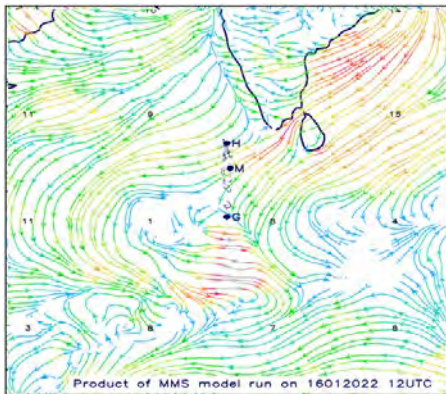


Figure 2 Surface wind model showing the line of convergence over south Maldives area on 16th Jan 2022. Source: MMS NWP Model

In association with the trans-equatorial flow, a low-level circulation was formed on 17th over 75°E, 10°S and under its influence average strong winds of 15 – 25 miles per hour was experienced in central atolls with rough seas from 17th till 19th January (Fig. 2). After 19th, generally fine weather was experienced over the country even though some few showers occurred in some places. This was mainly due to the persisting high pressure area (Fig.3) over Arabian Sea in the most days of the second half of the month.

During the month of January 2022, 17 White alerts were issued by Maldives Meteorological Service.

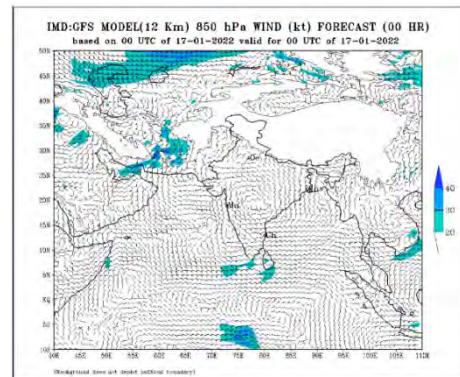


Figure 1 Surface wind model showing low level circulation in South east of Maldives on 17th Jan 2022. Source: Indian Met Dep.

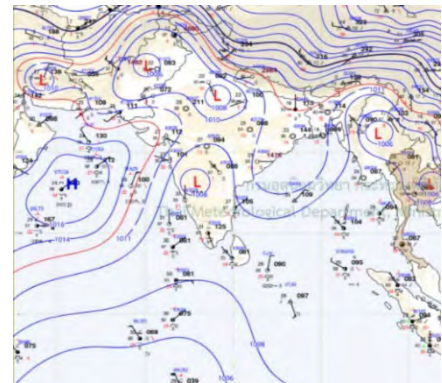


Figure 3 Synoptic chart of 1200Z on 30th Jan 2022, showing the High Pressure area over Arabian Sea. Source: Thai Met Dep

FEBRUARY

The month of February was fairly inactive, as the High-pressure area and its associated ridge persisted over the north Arabian Sea the whole month. Therefore, apart from few showers over central and northern atolls, generally fine weather was observed throughout the month over the country.

Notably, two Tropical Cyclones, “BATSIRAI” and “EMNATTI” formed over Southern Indian Ocean during the month (Fig 4 & 6). As both the systems formed over the southern hemisphere and considerably far from Maldives, there was no influence on the Maldives weather.

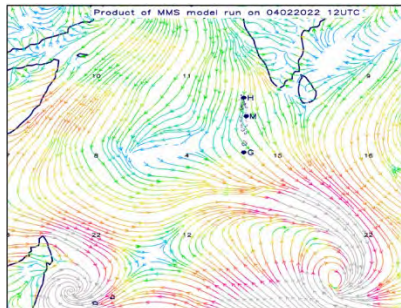


Figure 6 Surface wind model of 1700LT on 04 Feb 2022, showing the southern hemispheric cyclonic systems. Source: MMS NWP Model



Figure 4 Tropical Cyclone Forecast track of 0000Z on 21 Feb 2022. Source: MétéoFrance

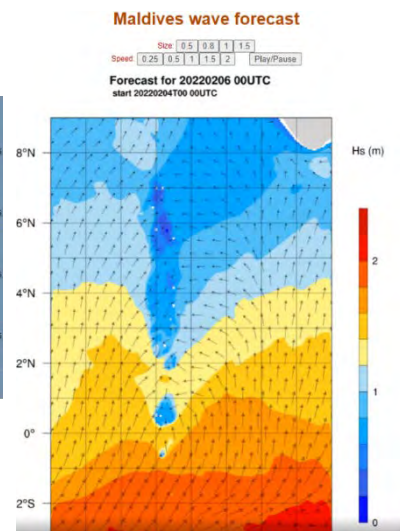


Figure 5 Wave Forecast of 0000Z on 06th Feb 2022, showing the elevated significant wave propagation from southern hemisphere to the Maldives area.

Although the both the systems were predicted to elevate the significant wave height and wave period over the southernmost atolls (Fig 5), no swell wave activity was observed during the period.

During the month of February 2022, only one White Alert was issued by Maldives Meteorological Service.

MARCH

The month of March saw a consistent High-Pressure Area over the Arabian Sea with the Inter Tropical Convergence Zone positioned south of the equator. As a result, no significant weather system was observed over the Maldives region during majority of the month. Typically, most of March 2022 was hot and dry with little to no significant rainfall.

However, towards the end of the month, the equatorial Indian Ocean and Bay of Bengal saw increased activity (Fig. 7).

On the 16th of March a Low-Pressure Area had formed over the equatorial Indian Ocean and adjoining southwest Bay of Bengal with its associated cyclonic circulation extending up to mid-tropospheric levels. By the 20th of March, the Low-Pressure area over southeast Bay of Bengal and adjoining Equatorial Indian Ocean had concentrated into a Depression and by the 22nd this system had intensified into a Deep-Depression located over north Andaman Sea and adjoining area of central and east central and southeast Bay of Bengal. This system failed to intensify further after crossing Myanmar coast and by the 23rd, had weakened to a depression and continued to weaken further.

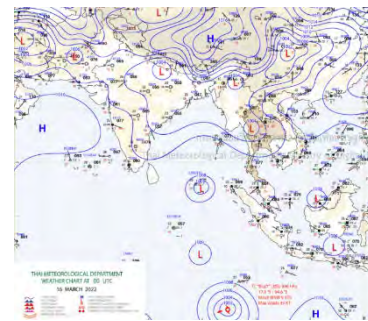


Figure 7 Synoptic chart of 0000Z on 16 March 22, showing the High Pressure over Arabian Sea, and increasing activity on the BoB and Equatorial Indian Ocean. Source: Thai Met

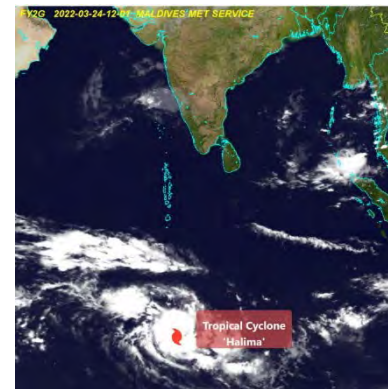


Figure 8 Color Composite Satellite image of 1200LT on 24 Mar 22, showing TC HALIMA in the Southern Indian Ocean. Source: CMA FY2G

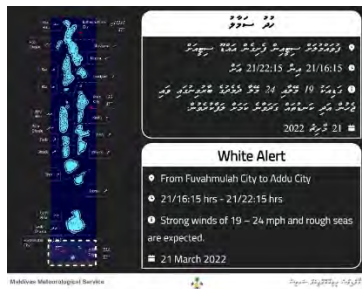


Figure 9 White Alert issued on 21st Mar 22. Source: MMS File

The other interesting phenomena observed on the 22nd, was a zone of disturbed weather over 10.7S, 85.5E. This system intensified and by the 24th, had developed into a Tropical Cyclone ‘HALIMA’ and located at approximately 12.5°S 74.3°E. This system was expected to recurve and continue southwards roughly along 74.3°E and then southeast thereafter. This system was observed to increase the average winds over southernmost area of Maldives. Additionally, the system was expected to elevate the significant wave height in the southern Maldives. No swell impact was observed, as the timings didn’t coincide with high tide timings.

One white alert was issued during the month for strong winds over the southernmost atolls on 21st March 2022 (Fig. 9).

APRIL

The month of April considered to be a transitional month between northeast and southwest monsoon, it experiences warm and dry days with thundershowers in between. As usual the high pressure over Arabian Sea persisted throughout the month with it becoming less or more organized throughout. On 07th April two cyclonic circulations had formed over east of Sri Lanka and Southeast Bay of Bengal as well, thus creating a wind convergence zone over southwest of Sri Lanka with parts of it covering Maldives as well. From 07th onwards convective clouds had started to build up over Lakshadweep and Maldives area.

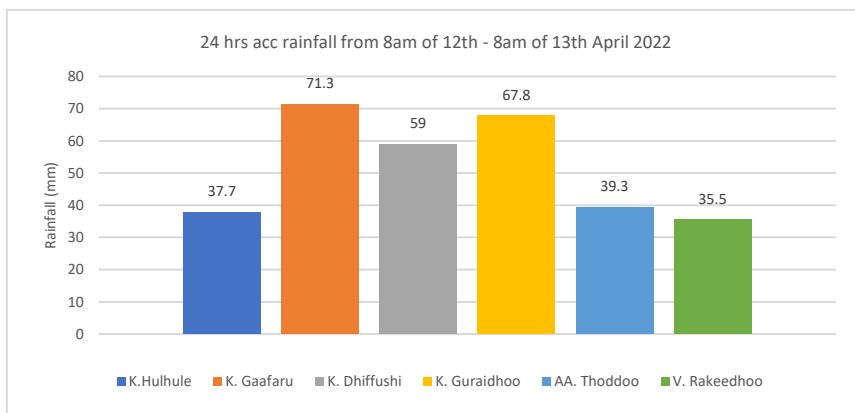


Figure 11 Daily Accumulated rainfall (mm) of 12th April 22

April 2022 saw the first heavy rainfall of the year over multiple atolls. On 11th the circulation over northwest of Sri Lanka moved westwards, causing the convergence zone to be more organized and chances of thunderclouds over Maldives became high. On 12th April scattered showers with isolated heavy thundershowers occurred over central parts of the country. On this day, maximum rainfall of 71.3mm, 67.8mm 59mm was recorded on Automatic Weather Stations (AWS) at K. Gaafaru, K. Guraidhoo and K. Dhiffushi respectively (Fig 10 and Fig 11).

From 15th onwards this circulation had become less organized and high pressure over Arabian Sea strengthened over Maldives area. Hot and humid days followed with feels like temperatures were increasing due to the high humidity and lower wind speeds.

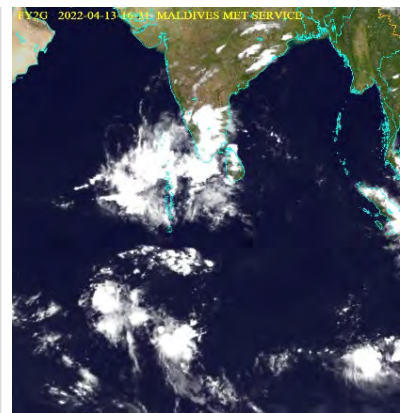


Figure 10 Color composite satellite image of 0500LT on 13th April 22, showing intense convective clouds over Maldives area.



Figure 12 Air & Feel like temperature on 1400LT of 17th Aug 22.

On 17th April at 1400hrs, K. Hulhule reported 35.5 degrees air temperature and 43.3 degrees feels like temperature (Fig. 12).

Meanwhile a cyclonic circulation had formed over Southwest Bay of Bengal of the coast of Tamil Nadu and significant divergence and convective activity were apparent over that area. On 21st this cyclonic circulation had become more organized, and under its influence a trough extended to part of Maldives. Rain clouds with significant thunderstorm activity was apparent during the upcoming days following 21st April. On 22nd April scattered showers, with isolated thundershowers, was experienced over central atolls with a maximum rainfall of 50.4mm recorded at K. Dhifushi AWS.

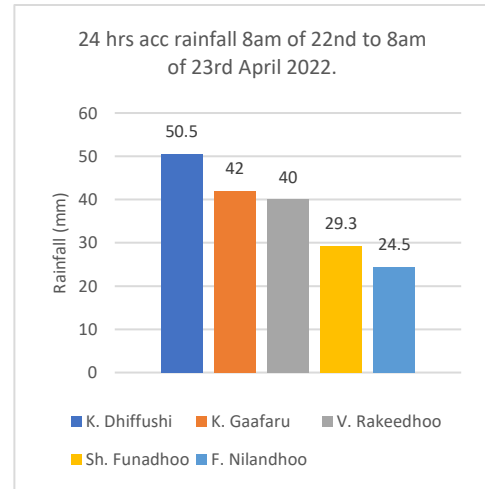


Figure 13 Daily Accumulated rainfall (mm) of 22nd April 22

From 24th Onwards stable climatic conditions returned, with little to no rainfall and high temperatures. While the High-pressure area over Arabian Sea was active, Cyclonic circulations had formed south of the equator with its southwesterly flow influencing over southern and central parts of the country. Consequently, dry northwesterly winds from Arabian Peninsula carried across the Arabian sea was converging west of Maldives with the wetter Southwest cross equatorial flow from South Indian Ocean. As winds were relatively weak, this was observed to create favorable conditions for significant thunderstorm activity over the country with central parts being the most active (Fig. 14). On 27th April a yellow alert was issued for moderate thunderstorms and heavy rain over the parts of central atolls due to dense convective cloud over the area (Fig 15).

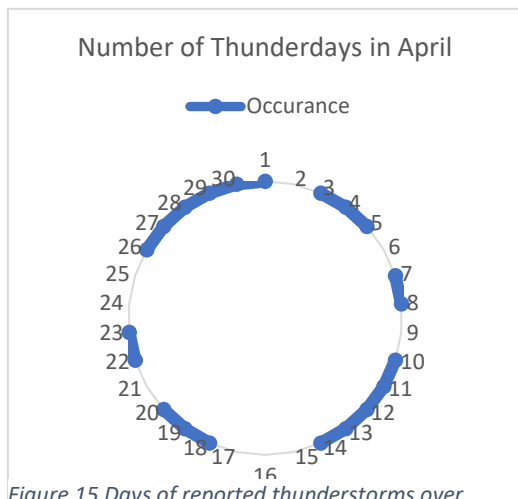


Figure 15 Days of reported thunderstorms over Maldives area in April 22.

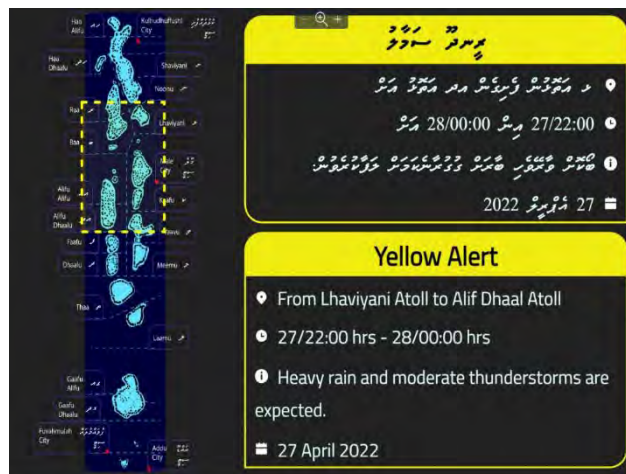


Figure 14 Yellow alert issued for moderate thunderstorm on 27th April 22.

During the last few days of the month, the convergence zone west of Maldives was becoming more organized with stronger southwesterly flow over central and southern atolls. A cyclonic circulation had formed west of Maldives and its trough persisted over Maldives from 29th onwards. Along with cyclonic circulations in South Indian Ocean, the convergence zone triggered intense convective activity leading to thundershowers over central and southern parts of the country during the end of April and into May. On 28th April a maximum rainfall of 57.4mm was recorded at AA. Himandhoo AWS.

Overall, towards the end of the month, conditions were getting favorable for the onset of this year's southwest monsoon.

A total of 12 alerts of which were 8 white and 4 yellow alerts, were sent out for severe weather during the month of April. It was noticeable that the alerts sent out towards the end of the month were for strong winds and rough seas (Fig 16).

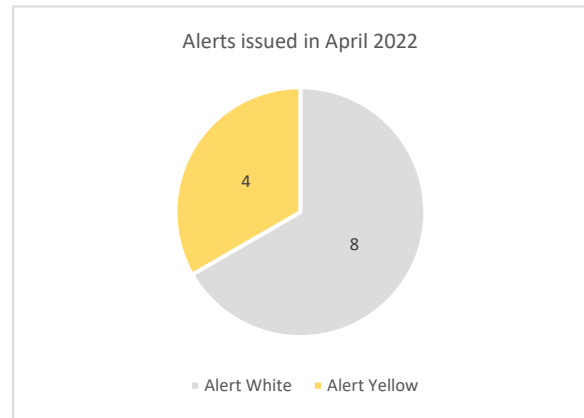


Figure 16 Alerts issued in April 2022.

MAY

May month started off with a westerly wind burst over north Indian ocean and Near Equatorial Trough (NET) around 5°S, east of 50°E and a cyclonic circulation over 4°S, 94°E. Additionally, the cross-equatorial flow was evident over far western Arabian Sea and a cyclonic circulation formed over South Andaman Sea and neighborhood on 4th May (Fig. 17). Environmental conditions were favorable for establishing monsoon over Maldives area with strong surface winds across the country and rain showers along with gusty winds mostly over southern atolls. Thus, onset of southwest monsoon was declared over southern area of Maldives on 8th May 2022, and over central and northern area on 12th May 2022 (Fig. 18).

A circulation over South Andaman Sea gradually intensified to form Tropical Cyclone ‘ASANI’ on 8th May and remained as a Severe Cyclonic storm till early morning of 11th May (Fig. 19). During this period the windy conditions deteriorated further across the Maldives.

Disruption to air travel was reported on 5th May due to dense cumulonimbus and associated cross wind in central and southern area. A Maldivian flight, National Flag carrier, veered off the runway at L. Kahdhoo airport at around 1945hrs of 5th May (<https://vaguthu.mv/news/726376>). On the same day an international flight from India to Velana International Airport (VIA) diverted to Gan International Airport due to strong cross wind over VIA runway area.

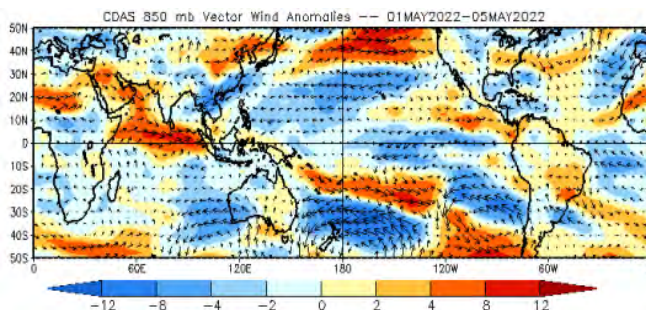


Figure 17 Wind Vector Anomalies at 850hPa level from 1st - 5th May 22. Source: www.cpc.ncep.noaa.gov

SW Monsoon Onset Dates			
Year	Date (May - June)		
	South	Central	North
2001	9	9	N/A
2002	2	2	7
2003	4	4	6
2004	2	3	4
2005	1	4	28
2006	8	15	28
2007	8	15	28
2008	5	15	26
2009	12	19	22
2010	13	15	18
2011	8	14	23
2012	16	23	4 June
2013	13	13	26
2014	9	19	19
2015	13	13	26
2016	9	19	19
2017	16	16	19
2018	11	11	11
2019	20	25	4 June
2020	12	18	21
2021	12	13	13
2022	8	12	12

Figure 18 Onset dates of Southwest Monsoon over Maldives area from 2001 – 2022

On 10th May, a man was reported to have died during the process of getting stuck between two boats whilst trying to secure the vessels during strong winds and rough seas while travelling from Male' to Addu City (<https://vaguthu.mv/news/728024>). A white alert for 22 – 27 mph winds were in effect at the time.

TC ASANI gradually weakened and made landfall over east coast of India on 12th May. The dissipation of the system and its associated trough commenced rainfall over northern and central parts of Maldives from 11th May onwards. Under the influence of the remnant trough, a cyclonic circulation formed in the Arabian sea over Lakshadweep area on the 15th May. With a well-positioned Mascarene High during the week, the Somali Jet formation was observed along with convergence of north westerlies and south westerlies from the Arabian Sea over Maldives area. This resulted in enhanced moisture over central and northern parts of Maldives, which allowed for the propagation of the monsoon over the whole country by 12th May. Then on, squally showers along with already strengthened winds were observed over north and central area till 18th May with impacts across the country (Fig. 19, 20).

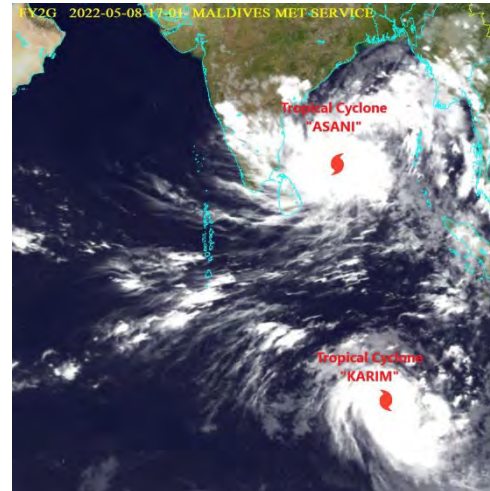


Figure 21 Color composite satellite image of 1700LT on 8th May 22, showing TC ASANI in Bay of Bengal, as well as TC KARIM in south west Indian Ocean. TC KARIM tracked away from Maldives area and had no impact.



Figure 19 Damages caused by squally showers in Ha. Dhidhdhoo on 14th May 22. Source: PSM

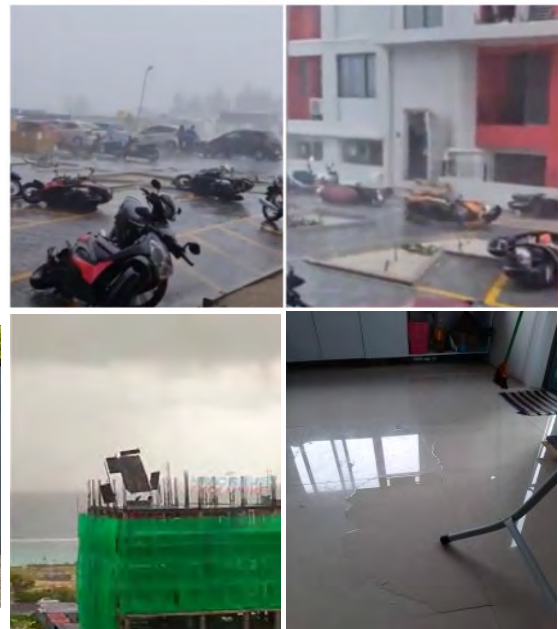


Figure 20 Squally showers caused; damages to parked vehicles (top), construction debris (bottom left) and water damage to apartments (bottom right) in Hulhumale phase 2 Hiya flats from 12 – 14th May. Source: Local media.

Strong winds and rough seas with huge waves disrupted sea transportation mostly in central and northern atolls during this month. In addition to continuous Alerts on 14th May, an advisory message about monsoon was issued in the previous evening (Fig. 23). Following continuous Yellow Advisory of MMS, National Disaster management Authority (NDMA) advised to take necessary precaution measures against strong winds and rough seas

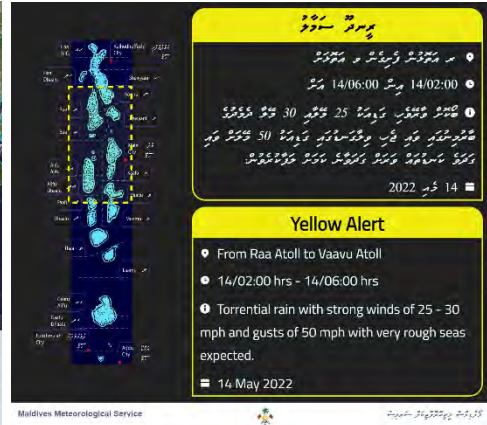
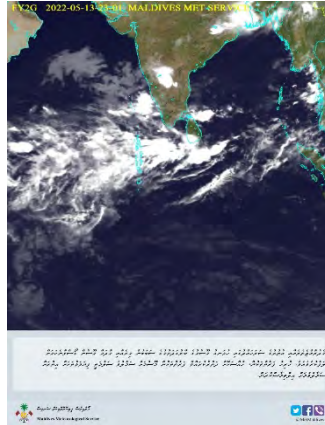


Figure 24 A public bulletin issued on 14th May due to sustained adverse weather conditions. (left) and, the first yellow alert of the episode (right)



Figure 23 Dewatering of floods in Hdh. Kulhudhuffushi due to torrential rain in north and central atolls on 17th May 22.



Figure 22 Bulletin by MTCC, informing 75% of scheduled sea transport routes were cancelled due to rough seas. Source: MTCC Tweet.

The period from 19th – 25th was relatively calm with a stable southwesterly flow of light to gentle breeze with generally clear skies over most of the country.

From 26th to 31st May, due to a cyclonic circulation over Lakshadweep area and wind convergence developed in the west of Maldives, enhanced convection and strengthened winds experienced over northern and central atolls. Due to strong winds and rough seas, sea transportation was disrupted in central and northern atolls particularly on 31st May,

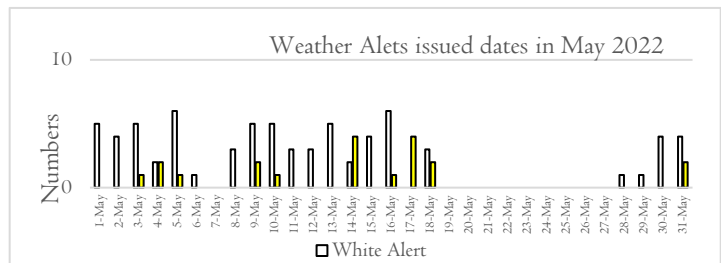


Figure 25 Alerts issued during May 2022

where ferry trips of Comprehensive Transport Network of Maldives Transport and Contracting Company Plc (MTCC) were cancelled (Fig. 23).

June

In the beginning of June, a dual cyclonic circulation had formed in the neighborhood of Maldives region, one over the west of Arabian Sea and another one over the central Bay of Bengal. Both of the circulation extended up to mid tropospheric level (Fig 26). The trough extended from both of the system was running from central Bay of Bengal to the west of Arabian Sea. Under the influence of this, at 850 hPa level, strong westerly winds were prevailing throughout the trough line. In addition, a shear zone was persisting roughly along Lat 10°N across south peninsula India between 3.1 and 4.5 km above mean sea-level. Further, another cyclonic circulation had formed over far southwest of Addu City on 6th June. This circulation in conjunction with the system in the Arabian sea, resulted to have a more dominant northwesterly surface wind flow over the Maldives region. However, on the following day, this circulation had moved southwestwards, further away from Maldives area. As a result, a COL region had formed at surface level over south of Maldives which brought weak monsoon flow over the Maldives (Fig. 26).

During the second week of June, the chief synoptic features include a formation of an offshore trough at mean sea level over the west coast of India which was persisted from 12th to 21st of June. Further, on 22nd of June, a low-pressure area was located on the far southwest of Maldives and it had moved far west of Maldives on the following day. Furthermore, a fresh cyclonic circulation had formed over east central and northeast Arabian Sea on 25th of June. Under the

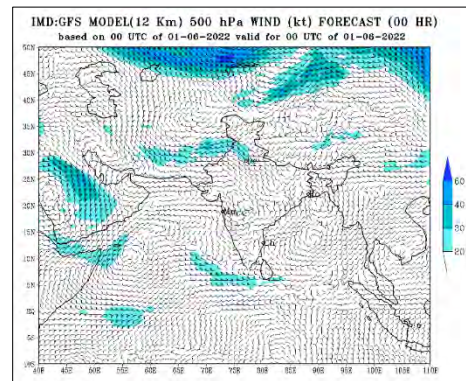


Figure 27 GFS Model forecast, showing a cyclonic circulation over central Bay of Bengal and West of Arabian Sea at 500 hPa level.

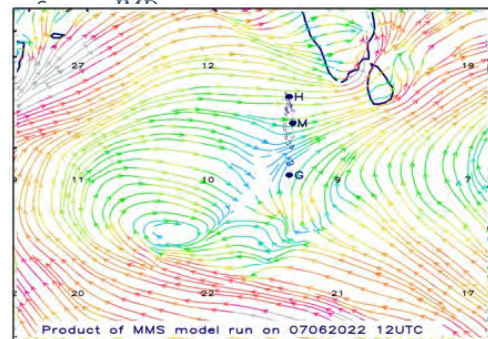


Figure 26 Wind at 1000hPa level on 7th June at 17:00 hrs local time, showing a COL region over south of Maldives.

Source: MMS NWP Model

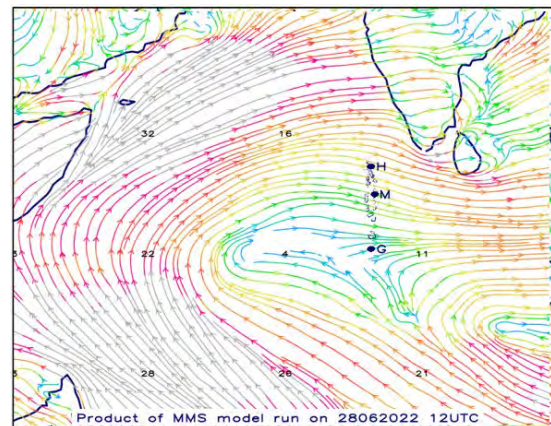


Figure 28 Surface Wind on 28th June at 1700 hrs local time, showing strong westerly winds prevailing over the Arabian sea. Source: MMS NWP Model

influence of it, a low-pressure area had formed over the same region on 27th of June and its associated cyclonic circulation extended to mid tropospheric level. Due to this system, Cross Equatorial Flow (CEF) became more prominent over coast of Somalia and Somali Jet was intensified. During the second half of the month, scattered showers were experienced over the country on most of the days with a few heavy showers on 24th and 29th of June. Heaviest rainfall of 64 and 99 mm were recorded at the AWS in V.Rakeedhoo and at the Meteorological office in Gdh.Kaadedhdhoo on 24th and 29th of June respectively (Fig. 29). Maximum gust wind speed of 47 mph recorded at the Meteorological office in Hdh.Hanimaadhoo on 29th June. During this month 9 white alerts were issued.

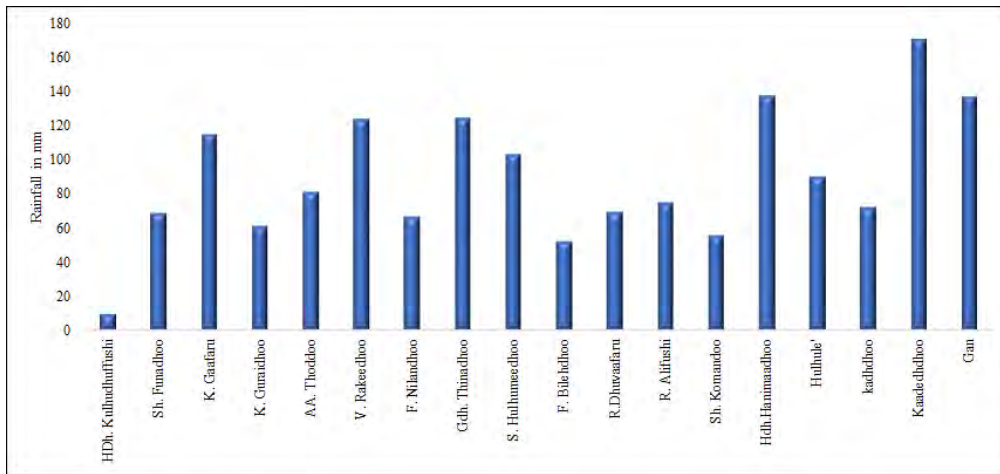
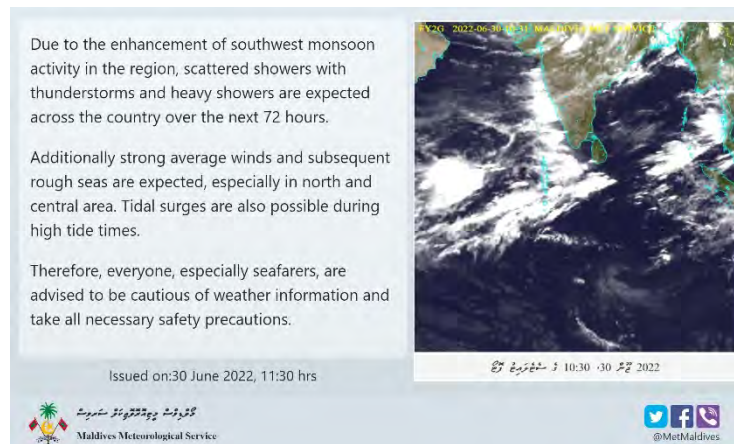


Figure 29 Accumulated rainfall for the month of June 2022.

JULY

The month of July started with a cyclonic circulation located south of Maldives, which was tracking west-northerly during the first half of the month. This system also caused a col region to form over Maldives. The Somali jet was active over Maldives during this period. These systems brought fairly wide spread showers over the country along with few heavy showers associated with col region during the first half of the month (1st July to 11th July). Winds were also fairly strong during this period with observed winds at 15- 25 mph in central northern atolls and 10 – 20 mph over southern atolls. Gust winds of 48mph and 47mph were recorded at Hanimaadhoo Meteorological Office and National Meteorological Office, respectively. Minor damages were reported during period in northern atolls according to NDMA.



Severe swell wave episodes occurred from 1st July to 3rd July in central and southern atolls. The swell waves were generated and propagated from the southern hemisphere due to the strong winds, and was further intensified during high tide times. The event was identified 24 hours prior and notified to the public on 30th June 2022. Subsequently, alerts were issued for swell surge (Fig. 30).

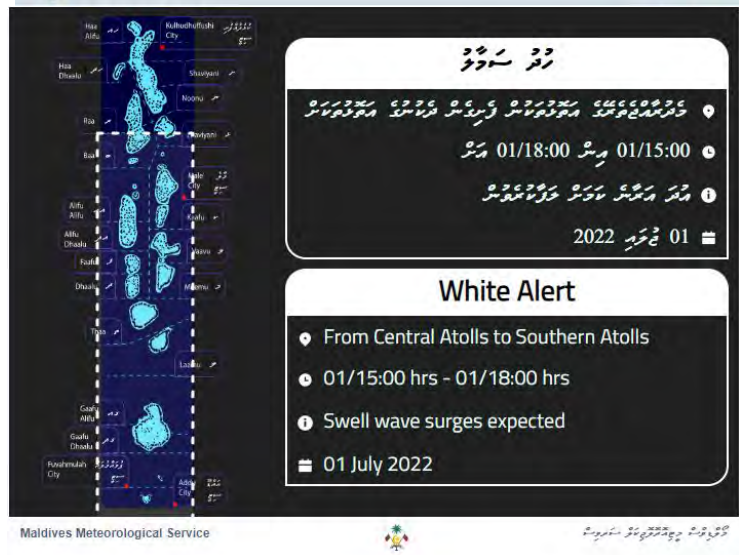


Figure 30 New Bulletin issued on 30 Jun 22, due to adverse weather (top), and swell surge alert issued the next day over south and central area.

In total 7 atolls suffered damage related to swell. Gaafu Dhaalu 5 islands suffered massive damage, among which notably 98% households were flooded during this event in Gdh. Madaveli. Thimarafushi also suffered massive damages due to sea water floods. In addition to that some families in Maradhoo, Addu city had to be temporarily relocated because of swell wave floods (Fig 31).



Figure 31 Impact of swell surge in southern and central atolls

Also, on 13 and 14th July swell wave episode were also reported in southern atolls. This only affected near shoreline areas and no extensive damages were reported.

On 10th July a cyclonic circulation formed over Bay of Bengal, near Odisha coast concentrated into a Low-Pressure Area (LPA), which further deepened in to a Well-marked system within the next 72 hours. On 14th this system weakened back to LPA. On 15th July a LPA over NE Arabian

concentrated in to a Well-marked LPA and future intensified in to a Depression on 17th July. From 16th cross equatorial flow over maldives was enhanced and a near equatorial circulation formed on the west of Maldives on 17th with strong upper-level divergence. The combined effects of these systems brought wide spread rain over the country from 16th with heavy showers mostly concentrated in central and southern atolls. On 17th July 147.4mm of rain was recorded in AA. Thoddu AWS followed by 139.4mm of rainfall in National Meteorological Center. Wide spread rainwater floods were reported in central atolls specially in Male' and MNDF was activated for dewatering. Strong winds and very rough seas were reported mainly in northern and central areas (Fig. 32).



Figure 32 Daily accumulated rainfall of 17th July 2022

After a brief period of clear days end of July (29th to 31st) brought widespread rain and frequent heavy showers over the country. Persistent strong winds were also prevailed from 30th July to 31st July. On 30th a news bulletin was issued to public (Fig 33).



Figure 33 News Bulletin issued on 30th June 22

Heavy showers were more prominent in northern and southern atolls during this period. Heavy floods were reported in Addu city and Noonu atoll. During this period a cyclonic circulation was present in far south east of Maldives moving slow Northwestwards. A cyclonic circulation was also present in south central BoB and its trough was extending over Maldives. Due to this system and cross equatorial flow, intense convection has formed over Maldives area. According to NDMA one house form N.Maalhendhoo was severely affected by floods and family living there had to be relocated. Additionally, NDMA reported that R. Atoll and Gaaf Atoll also experienced minor wave surges during this period but no damages were reported (Fig. 34).



Figure 34 Flood due to heavy rainfall in N. Maalhendhoo (left) and Addu City (right)

Month of July was observed to be a fairly wet month, with wide spread rain showers and strong westerly winds over the country. Only short break of few days of fine weather was recorded in between the wet spells and strong winds. Severe swells waves also occurred during the start of the month in central and southern atolls. In total 67 Alerts were issued in July. 59 White, 8 Yellow. (7 white alerts were issued for wave surges.)

AUGUST 2022

The month of August began with wet spells and strong winds across the country. The trough from central parts of south Bay of Bengal to Comorin Area across Maldives caused heavy rain and strong winds across the country. Significant amount of rainfall recorded for the 1st of August were 99 mm in S. Hulhumeedhoo, 57 mm in S. Gan, and 55 mm in L. Kahdhoo, respectively. Average surface winds of 15 – 25 miles per hour was prevailed mostly over central and northern atolls. Seas were rough to very rough and local sea transportation was interrupted across the country. The trough persisted over the same area for 3 consecutive days and deepen further and formed a low-level circulation over the Bay of Bengal on 4th of August. Another low-pressure area developed over the southeast of Maldives on the same day. In the presence of these two systems westerly winds flow was enhanced. Heavy rainfall of 88 millimeters was recorded at S. Hulhumeedhoo AWS on 4th August. The influence of these two systems, heavy rain and strong winds were experienced over the country for the subsequent 48 hours.

On 07th August another low-pressure area formed over the northwest Bay of Bengal and concentrated into a well-marked low-pressure area on 8th August and lasted till 12th August. Its associated trough extended up to Maldives area. Due that intense to very intense convective clouds formed over the country, hence heavy rainfall was observed over the country. Apart from heavy rain, winds were strong mostly over central and northern atolls.

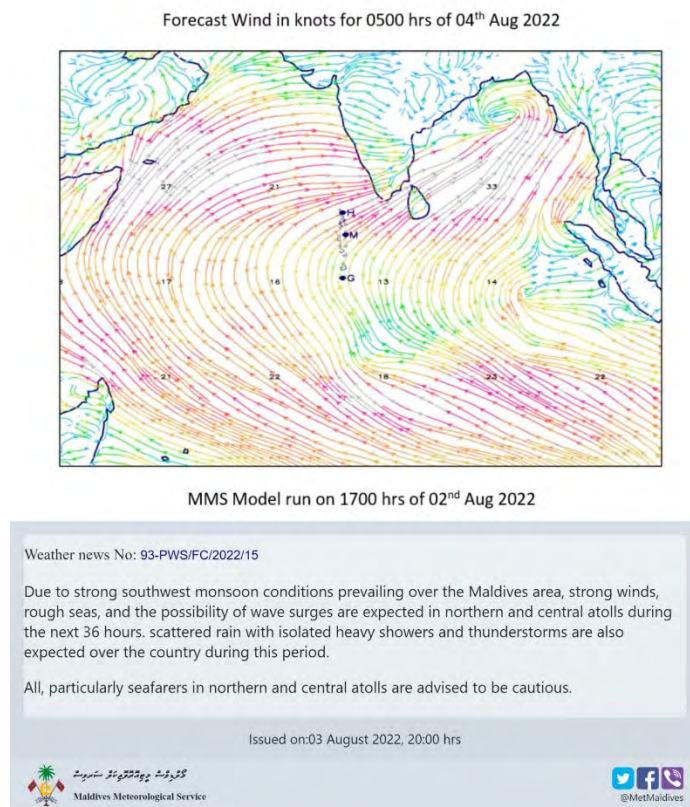


Figure 35 News Bulletin issued on 03 August about enhanced south west monsoon conditions over the country.

A cyclonic circulation formed about 3°S, 87°E on 22nd August and it moved southwest wards and remained as a weak low till the end of the month. At the same time another cyclonic circulation developed over the east central Bay of Bengal on 21st Aug. Due to presence of these two systems there was moderate to intense convergence mostly over northern part of the country. The combined influence of the systems in both hemispheres, cross-equatorial flow was enhanced over a widespread area.

The Madden Julian Oscillation propagated into Indian Ocean during the last week of the month, and wind confluence was enhanced over the country. As a result, strong winds of 15 – 25 miles per hour with frequents gusts were observed over the northern and central atolls during the last few days of the month.

On 31st August N. Landhoo boat sunk near K. Gaafaru, due to strong winds and rough seas. The boat was sunk partially initially and recovered later. Extensive damages to cargo were reported in this incident.

A total of 30 alerts were issued during this month, which were 23 white and 7 yellow alerts.



Figure 36 FY2G Satellite image of 31 Aug 2022 7am (left) and wrecked incident of Landhoo boat on 31st Aug (right)

SEPTEMBER

The month started with a cyclonic circulation over south Tamilnadu, its trough extending over Maldives, and another cyclonic circulation south of Maldives. Strong convergence was observed in the region due to these systems, resulting in strong winds and rainy episodes over the country. Average strong winds of up to 15 – 25 mph was experienced all over the country.

On 3rd September Gdh. Kaadedhoo Met office recorded 124.6 mm, with an hourly maximum rainfall of 43.3 mm. The following day fairly widespread rain with occasional heavy showers were experienced over central and northern atolls (Figure 36). With squally showers along with gusts of 39 – 44 mph was recorded at several places in northern and central atolls. Maldives National Defense Force reported that dewatering response was carried out in F. Nilandhoo following floods after heavy rain on 4th September (Figure 37).

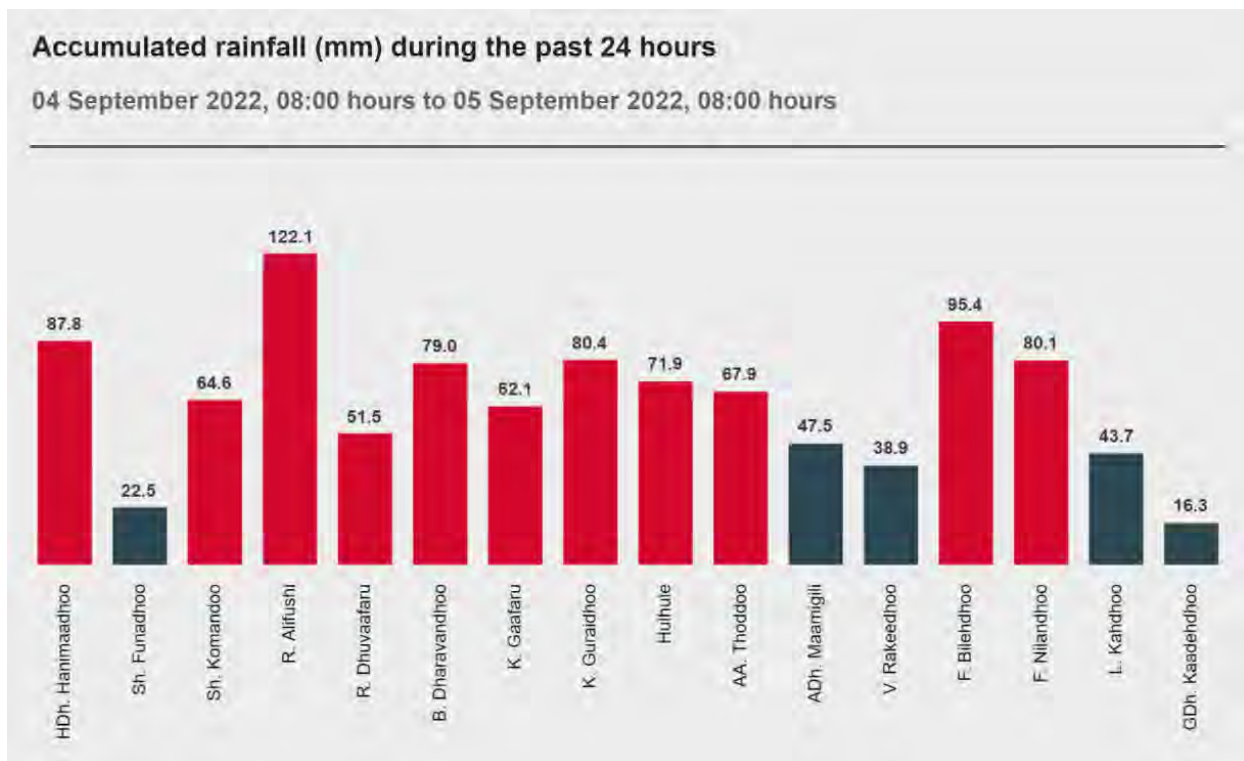


Figure 37 Daily accumulated (mm) during 4th September 2022

Thereafter, the second episode of adverse weather was from 25th onwards. A wind convergence area over central and southern atolls was observed due to a circulation far south of Maldives and Northeasterly Cross Equatorial Flow from North Arabian Sea. Winds were strengthening due to a

cyclonic circulation over central Bay of Bengal which has intensified to a Tropical Storm by 29th September. Strong winds of 13 – 23 mph was observed over southern atolls. Consequentially from 26th onwards, scattered showers with occasional heavy showers were observed over central and southern atolls. Heavy rainfall of 70.6 mm over S. Gan on 27th and 59.3 mm over AA. Thodoo on 29th were the key records. Maldives National Defence Force reported that dewatering response was carried out in Gn. Fuvahmulah following floods after heavy rain on 28th September (Figure 37).



Figure 38 Dewatering response by MNDF following heavy rain in F. Nilandhoo on 4th September (left) and Gn. Fuvahmulah on 28th September (right).

For the month of September total 32 alerts were sent out, 29 of them were white alerts and 3 of them were yellow alerts. Maximum daily accumulated rainfall of September was 124.6 mm recorded at Gdh. Kaadehdhoo Met office.

October

October 2022 was wetter than normal across the country with relatively higher rainfall in southern atolls than rest of the country. Apart from significant rainfall over southern atolls on 6th October, two episodes of inundation were experienced during the month. Firstly, 10th – 13th October across the country and lastly 27th – 31st October over southern atolls. Strengthened winds were also sustained particularly over part of central and northern atolls till 24th October and few islands in the central experienced wave surges on 13th October. Two cyclonic storms developed over Indian Ocean during the month, storm BALITA over around 12.6°S, 85.8°E on 8 October and moved south-southeastwards. Cyclone “SITRANG” over west-central Bay of Bengal at 16.4°N, 88.1°E on 23rd October which gradually moved north-northeastwards and had no influence over Maldives area.

October month started while withdrawal of southwest monsoon causing active monsoon over the Maldives. Influencing weather systems by then include, southwestward tilted cyclonic circulation over west-central BoB extending upto 5.8 km amsl, trans-equatorial trade wind flow over a large area and a westerly wind burst over equatorial Indian ocean over east of 70°E. At the beginning of the month, an elongated cyclonic circulation also developed over around 5°S, 90°E with Near Equatorial Trough over east of 5°S, 80°E. Combined effect of these systems caused wind convergence with intense convection over Maldives area. Due to prevailing bad weather condition, an advisory was in effect from 30th September.

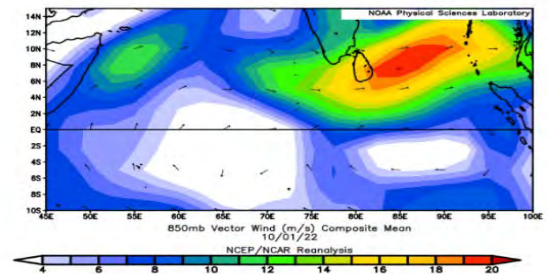


Figure 39 Reanalysis data showing strong winds over Maldives and adjoining eastern side including Bay of Bengal on 1st October 2022, Source: <https://psl.noaa.gov/>. (top) and MNDF Tweet on 1st October reporting the marine incident that day (bottom).

On 1st October, a boat travelling with 7 crew members from 'Thoothukudi, India to Male', Maldives sunk over 30 nautical miles east of K. Kaashidhoo, where 6 of them were rescued and one had died (Figure 38).

On 6th October, trough was located over south of Maldives due to the Tropical Depression over around 9.5S, 86.3E which later concentrated into a tropical storm (Figure 39). Combined effect of this system and strong north westerlies from Arabian Sea caused enhanced moisture incursion over southern part of the country, resulting widespread rain over the area with rainfall records of more than 50 millimeters in 5 stations.

October 10th -13th was the most eventful period during this month with Near Equatorial Trough at 65°E between 3°S - 7°S and a cyclonic circulation over South Indian Peninsula, which shifted over Comorin area on 12th October. Combined effect of these systems brought fairly widespread rain with isolated heavy showers to the Maldives along with strengthened winds over the area (Figure 40). Highest rainfall of the month occurred during this period. Significant waves were predicted by models for southern part of Maldives and eastern side of the country, while strong sea currents were predicted over the whole country (Figure 40).

On 13th October, in the early morning, two islands including Dhigurah and Dhangethi in the southeast of Alifu Dhaalu atoll experienced wave surges. Dhigurah was severely affected by swells, where according to NDMA, there were damage in 6 residential houses, one guesthouse, a shop and some vessels in the harbor were also affected (Figure 41). According to Island council, waves that approached from eastern side of the island around 12:50 hrs midnight hit the island over 8 feet seawall. Some local witnesses estimated the height of the waves to be

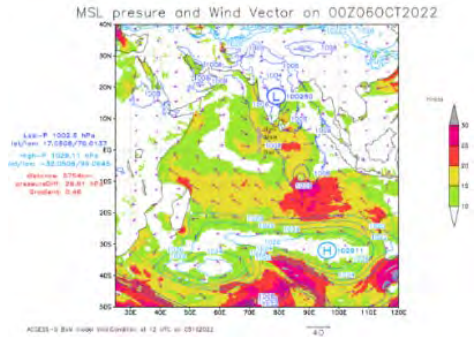
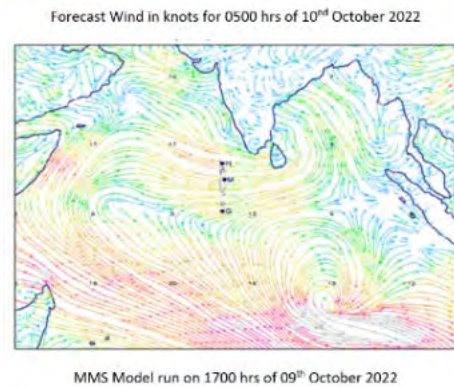


Figure 40 ACCESS-G-BoM model run at 1700 hrs local on 05th October, indicating strong winds over Maldives area with a Low Pressure over Southeast of Maldives for 0500 hrs on 6th October



MMS Model run on 1700 hrs of 09th October 2022

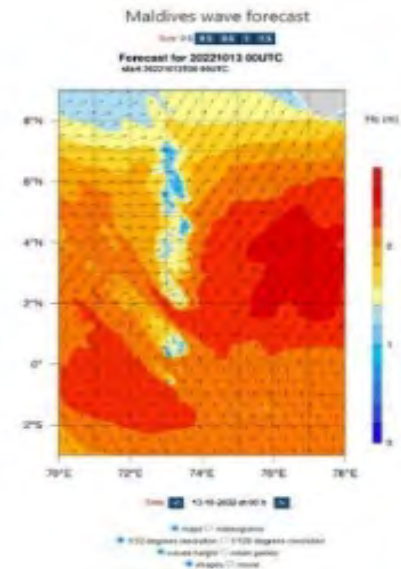


Figure 41 Strong winds predicted by MMS WRF model for 10th October (top) and MMS Wave model indicating significant waves in southern atolls and east of Maldives on 13th October (bottom)

13-15 feet high and also highlighted that swell surge phenomenon are not very common in the island emphasizing minimal impact from 2004 Tsunami. The island also experienced inundation due to heavy rain on the same day. The other island was Dhangethi where waves that approached from western side of the island did not reach to residential area. Thus, no damages reported from this island. On the same day, Lh.Naifaru was inundated due to heavy rain and flood mitigation response was carried out (Figure 42). Additionally, a fishing vessel with 6 crew members travelling from Male to Raa atoll reported engine failure and drifting over 12 nm west of Kaafu Kaashodhoo due to strong winds and rough seas.

October 27th -31st, cyclonic circulation formed over northwest of Maldives became more marked and shifted east-southeastwards and laid over around 5.01°N, 71.56°E on 27th October. Intense convection developed over the area brought heavy showers in few places of northern and central atolls. A COL area also persisted in the east of Maldives and Near Equatorial Trough was organizing with multiple vorticity area over around 2°-4°S, 62°-89°E. Thus, from 28th October onwards, southern area became more active than rest of the country with strong winds and occasional heavy showers over most places (Figure 43).

There were 66 Alerts issued during the month including 57 white Information and 9 Yellow Advisory (Figure 43).

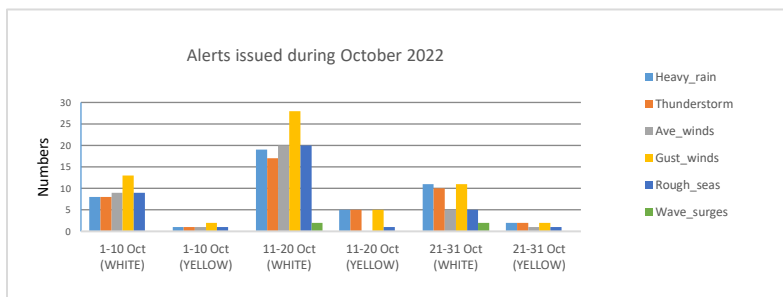


Figure 44 Breakdown of Alerts issued during month of Oct 2022. Maximum number of alerts were issued between 11 – 20th October, for wind and rough seas.

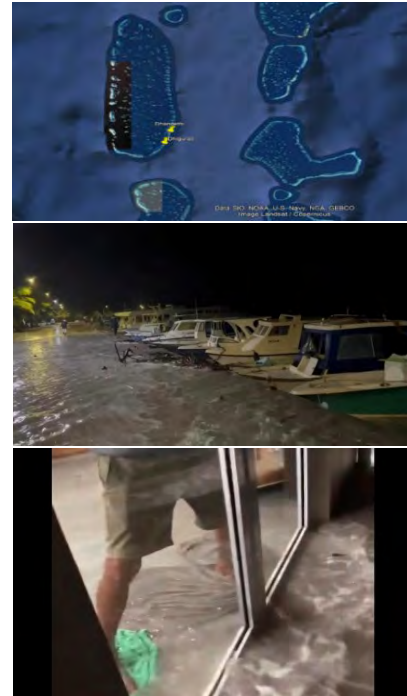


Figure 43 Two nearby islands marked that experienced swell surges on 13th October (top), Waves surges in Adh.Dhigurah (mid and bottom), source: <https://thepress.mv/138911>



Figure 42 Flooding in Lh.Naifaru on 13th October. Source: <https://www.dhidaily.com/80240>

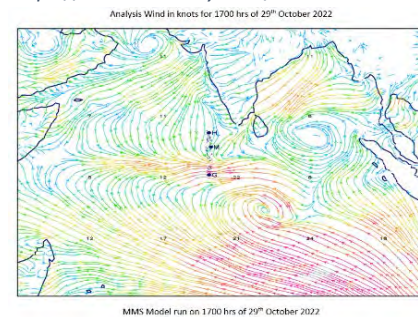


Figure 45 MMS WRF model run at 1700 hrs local on 29 October indicating very strong winds over southern part of Maldives.

NOVEMBER

On 9th November, a Low-Pressure Area (LPA) has formed over southwest Bay of Bengal and adjoining Equatorial Indian Ocean and off the coast of Sri Lanka (Figure 45). Under the influence of this system, intense convective clouds formed in the east of Maldives and some of these

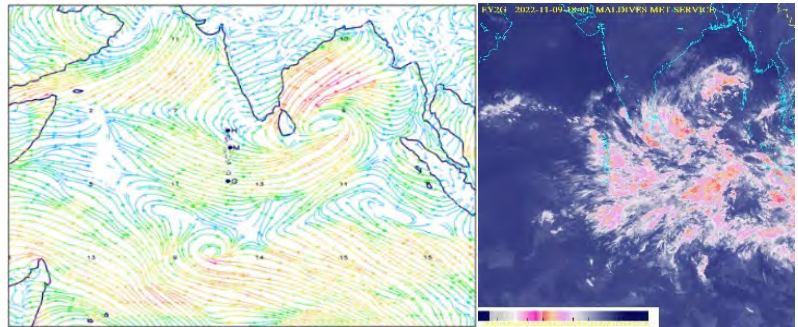


Figure 46 Forecast for streamline from MMS Model, valid for 9th Nov 1200 UTC, showing LPA over Southwest Bay of Bengal (left). Satellite image of 9th Nov at 1800 hrs local time, showing the cloud movement from east to west (right).

clouds moved from east to west. It was seen from the satellite imageries that the Arabian sea, west of Maldives was dry and having less moisture compared to the east of Maldives (Figure 45). Hence there was a possibility of occurrence of significant thunder and lightning due to differences in temperature between west and east of Maldives. It was seen from satellite imageries that the clouds in the east of Maldives was slowly moving towards west as the westerly winds were light over the area.

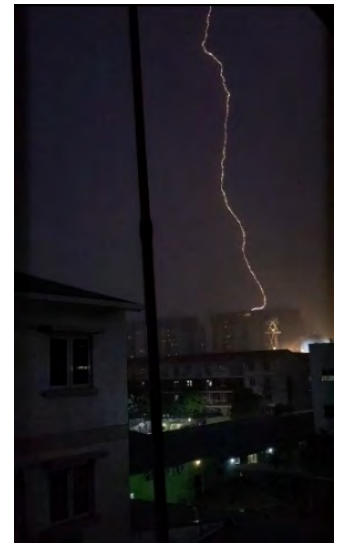


Figure 47 An image showing lightning strikes over a building at Hulhumale' on 9th Nov. Source: social media.

Lightning strikes hit a building in Hulhumale due to moderate thunderstorms occurred. A White Alert was issued for the area of Haa Alifu Atoll to Dhaalu atoll and then a yellow Alert was issued at 1900 hours over the area between Lhaviyani atoll and Faafu Atoll. News reported that some electronic items were destroyed from some of the Hiya flats buildings at Phase two in Hulhumale'.

The LPA over southwest Bay of Bengal and adjoining Equatorial Indian Ocean, off coast of Sri Lanka has intensified in to a Well-Marked Low-Pressure Area (WMLPA) on 11th November. During the subsequent 48 hours, it moved west northwestwards and emerged into Southeast Arabian Sea as a Low-pressure system. The system became less marked on the following day. However, its associated

cyclonic circulation persisted over the Southwest Arabian Sea and adjoining west Equatorial Indian Ocean until 18th of November. During this period, a trough associated with this circulation was extending from southeast Arabian Sea to Comorin area, across Kerala and South Tamil Nadu coast.

Another Low-Pressure Area (LPA) formed over south Andaman Sea and neighborhood on 17th of November. This system intensified from a LPA to WMLPA over the next 48 hours (Figure 47). It moved west northwestwards and intensified into a Depression on the following day, 20th of November and weakened into a LPA on 23rd of November. During the period 17th to 20th November, an east-west oriented trough was running from southeast of Arabian Sea through central and northern part of Maldives. As a result, a significant number of convective clouds were observed over central and some parts of northern atolls on 17th and 18th of November.

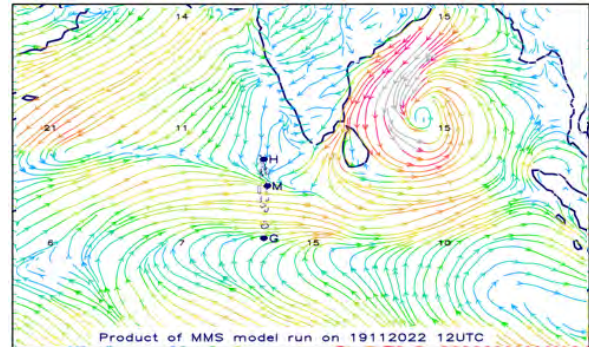


Figure 48 Wind at surface level on 19th Nov at 1700 local time, showing an LPA which was formed over south Andaman Sea and neighborhood on 16th of November and an east west trough which was running from Arabian Sea through central and northern part of Maldives.

Heavy rainfall of 110.8 mm was recorded at the AWS in F. Nilandhoo, on 17th November – which was the heaviest rainfall among all stations for the month. Strong winds of 19 – 24 miles per hour prevailed over some parts of central atolls on 21st of November. Maximum gust wind speed of 44 miles per hour recorded at the AWS in Adh. Maamigili followed by 38 miles per hour in F. Nilandhoo on the same day. No impact or damages were reported.

During the month of November, total 25 alerts were issued and 24 of them were white alerts and there was only 1 yellow alert.

DECEMBER

A Low-Pressure circulation formed over Andaman Sea on 05th December 2022. The system tracked west northwestward and intensified into Tropical Cyclone MANDOUS over Southeast Bay of Bengal on 08th December 2022 and made landfall over Tamil Nadu coast the next day (Figure 48). Under the influence of this system, westerly winds over central and southern Maldives was strengthened, with increased convective activity and rough seas.

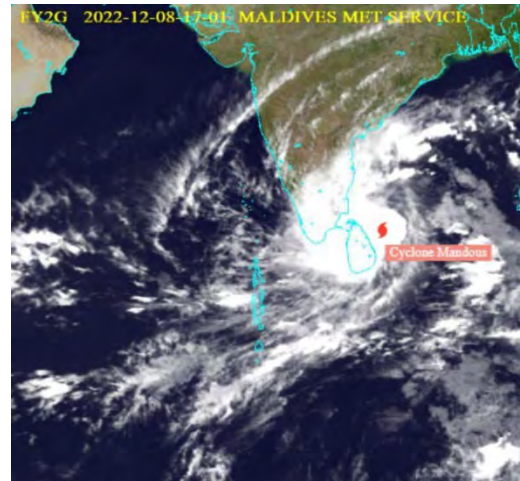


Figure 49 FY2G Satellite image on 1700hrs of 8th December 2022, showing Tropical Cyclone MANDOUS tracking towards south east Indian coastline.

On 8th December 2022, stations in Addu City and National Meteorological Center, Hulhule' reported heavy rainfall during the preceding 24 hours (Figure 49).

Along with scattered showers, strong gust winds were also observed during the period. Maximum gust winds of 40, 42 and 45 miles per hour were reported at F. Nilandhoo, B Dharavandhoo and Hulhule' on 10th December 2022.

No significant impacts were reported during the event.

24hr Accumulated heavy rainfall (mm) 7th - 8th Dec 2022

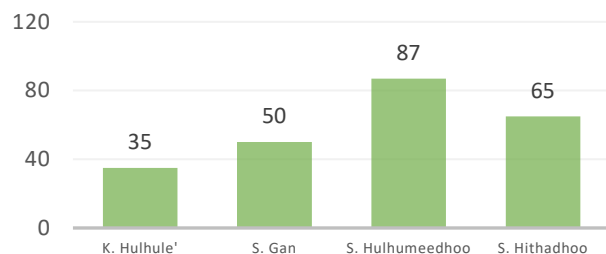


Figure 50 Daily heavy rainfall (exceeding 30mm) from 0800am of 7th December - 0800am 8th December

The remnant of Cyclone MANDOUS passed over India and reemerged into the Arabian Sea as a Low Pressure on 13th December, and intensified over the subsequent 48 hours to a Deep Depression before weakening and dissipating over Arabian sea on 16th December.



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