

1946-2010: Worldwide Hurricane Activity

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Abstract

This paper complements a previous analysis comparing the 2007 IPCC statements [1], with an analysis of the data itself¹.

In this case, no analysis is made. All that is shown is the total activity from the years 1946-2010 (from 1977 in some parts of the world which lag behind a little in good quality data) in terms of Tropical Storms, Hurricanes and major Hurricanes, (3 or larger on the Saffir-Simpson scale). 2010 has been one of the quietest years since good records began some 30 years ago although the North Atlantic continued to be very active.

Keywords: Severe weather event frequency, Hurricanes, global warming

1 Document revision history

Web publication allows the easy privilege of updating papers quickly to respond to feedback. This is an active project in view of the interesting patterns apparent in these data so the revision history so far in reverse temporal order is as follows:-

- 05-Mar-2011v1. Data for the complete year 2010 has been added. 2010 appears to have been the quietest year since complete records (i.e. of comparable quality for each of the hurricane areas) became available.

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¹<http://www.leshatton.org/Hurricanes.2010.html>

2 Some comments on the raw data

Figures 1, 2, 3, 4 and 5 contain the North Atlantic, East Pacific, West Pacific, North Indian and South Indian datasets respectively for the number of hurricanes and the number of major hurricanes respectively over the measurement periods covered here.

In the North Atlantic dataset Figure 1, hints of two peaks of activity 1947-1965 and 1995-2010 can be seen with a relatively inactive period 1965-1995. 2010 was a very active year in this area although not as high as the unusual year 2005.

In the Eastern Pacific dataset, Figure 2, there are hints of an interesting anti-correlation with a relative peak of activity 1970-2000 with a decline in activity since. In Figure 3, the West Pacific dataset, there appears to be a slight decline for about 10 years from 1972-1982.

In the North Indian dataset, Figure 4, there appears to be a peak of activity in the decade surrounding 1995 with apparent decline afterwards until 2010. Finally, in the South Indian dataset, Figure 5, there are signs that the number and intensity of hurricanes appears to have had a relatively active period in the range 1975-2000 followed by a decline in activity, which is similar to the trend observed in the Eastern Pacific data. Finally Figures 6 and 7 show the collected data for each hemisphere and Figure 8 shows the collected worldwide data since 1977 including tropical storms, (the earliest year here for which all datasets are complete and apparently of consistent quality). Figure 7 is therefore identical with Figure 5 but will differ as data from the South Pacific becomes available.

For anybody interested in data analysis, Figure 8 is fascinating. Visually, the dataset shows the number of Tropical Storms roughly constant in the last 10 years and the number of hurricanes and major hurricanes in decline from a peak in the early 1990s. This Figure also puts the unprecedented North Atlantic storm season of 2005 into global context where it doesn't particularly stand out.

These observations are only hints but might be worth pursuing further as they suggest coupling. The next stage taken here will be to investigate any significant micro-patterns present.

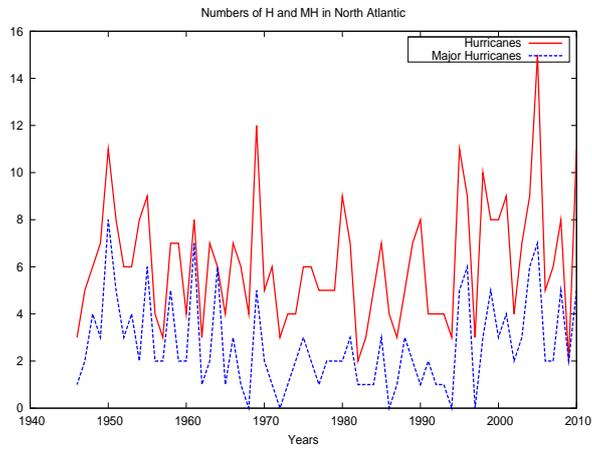


Figure 1: Northern Atlantic hurricanes and major hurricanes in the last 50 years.

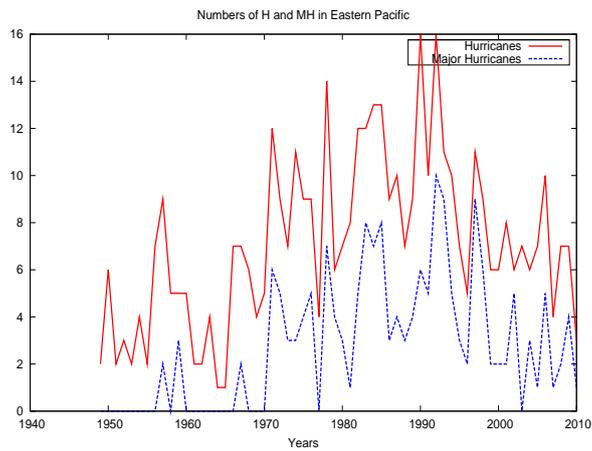


Figure 2: Eastern Pacific hurricanes and major hurricanes in the last 50 years.

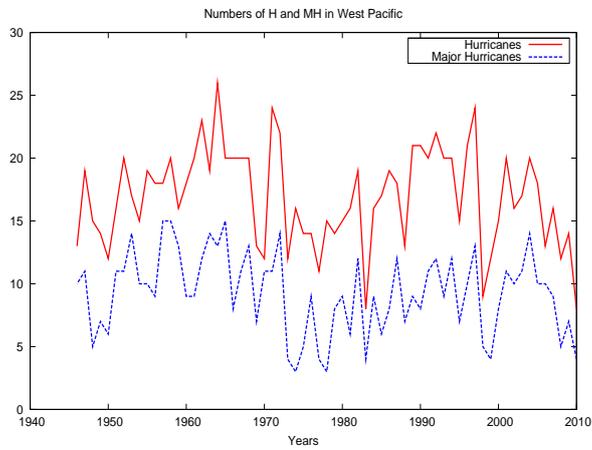


Figure 3: West Pacific hurricanes and major hurricanes in the last 60 years.

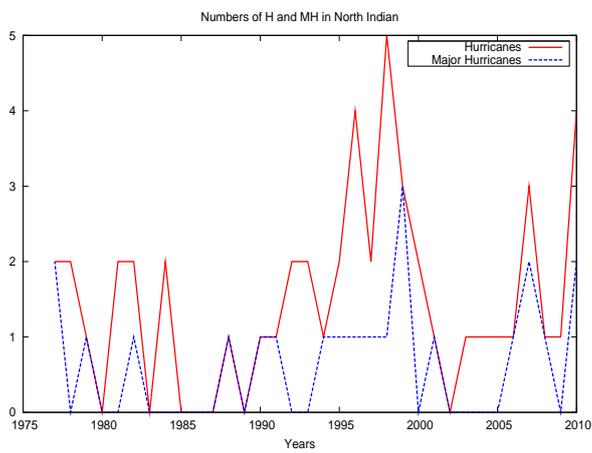


Figure 4: North Indian hurricanes and major hurricanes in the last 30 years.

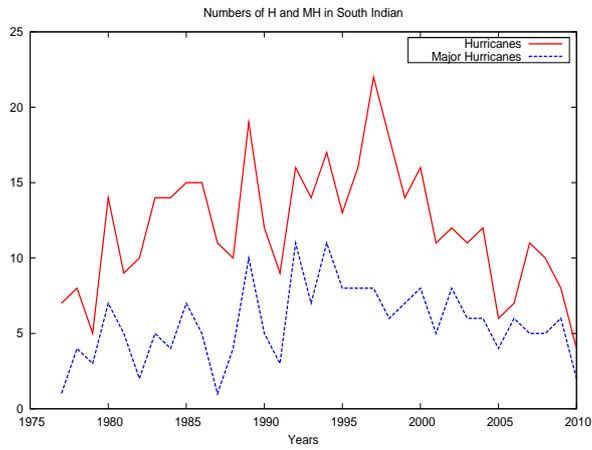


Figure 5: South Indian hurricanes and major hurricanes in the last 30 years.

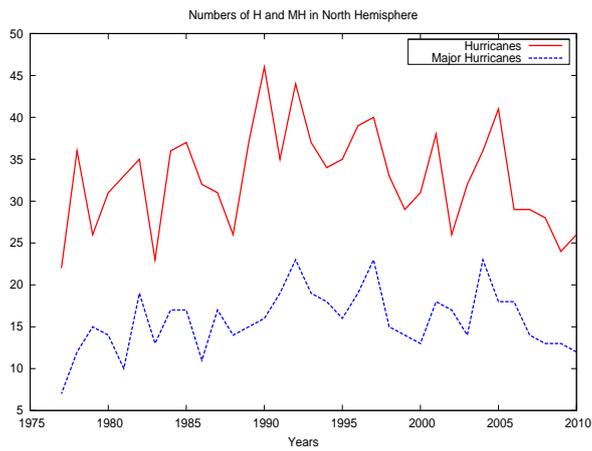


Figure 6: Northern Hemisphere hurricanes and major hurricanes in the last 30 years.

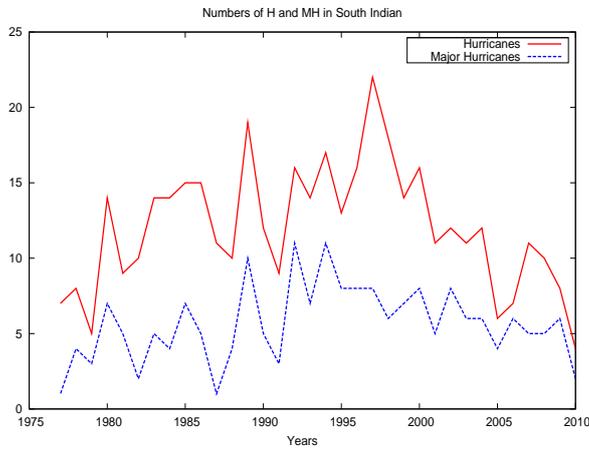


Figure 7: Southern Hemisphere hurricanes and major hurricanes in the last 30 years. This is currently identical to the South Indian data but as more South Pacific data is added, it will change.

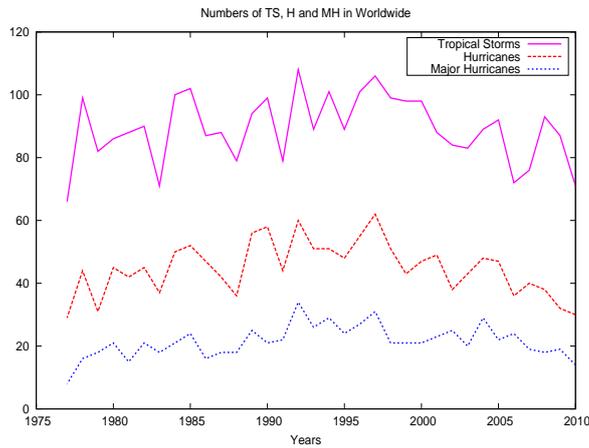


Figure 8: Worldwide tropical storms, hurricanes and major hurricanes in the last 30 years. This currently excludes South Pacific data which is incomplete so this is estimated to represent 90-95% of the total activity.

3 Conclusions

Although the North Atlantic showed an upsurge, overall, 2010 is the lowest level of hurricane activity worldwide for 30 years.

4 Pedagogical note

In order to allow easy open access to the data and analysis for this paper, the data were all taken from [2] and assembled in a spreadsheet along with data analysis algorithms. The matching zip file is available². The zip file contains the Excel spreadsheet with the same version number as this document as well as the main analysis and data and also .dat files and a .gnu file which, with the excellent *gnuplot*, can be used to re-generate all the figures in this paper.

It is hoped that this may help to convince other climate data owners to release all their data and software used to generate results into the public domain to achieve the same benefits as we enjoy with open source software. If you have a Linux system, all you need to do is unzip the archive and then issue the command

```
% gnuplot hurricanes.gnu
```

This will generate all the figures shown above. You will be able to read the Excel file with *Open Office*, (which is how I created it).

5 Acknowledgements

This is a brief thank you to United States government bodies such as NOAA and NASA as well as the Unisys corporation who by their enlightened attitude to the promotion of science for the public good, make data such as this freely available.

References

- [1] United Nations. Climate Change 2007, the Fourth Assessment Report (AR4) of the United Nations Intergovernmental Panel on Climate Change, 2007.

²<http://www.leshatton.org/Documents/Data.Hurricanes.1946-2010.zip>

- [2] Unisys Weather. Hurricane data by year, March 2011.
<http://weather.unisys.com/hurricane/>.