Information obtained from successive weather radar images

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Abstract: This work aimed to present a contribution in the didactic part of the presentation of a life cycle of a convective system that generated some kind of severe weather, through successive maxcappi images of meteorological radar standing out the image closest time of occurrence of the severe event.
Key words: image, weather radar, severe weather.

I – INTRODUCTION

The error below was found in the geography book of the high school of the daughter of one of the authors, where it was intended to show the general circulation of the atmosphere (Fig. 1). It is observed that the winds are erroneously indicated. Editors were alerted to the error via e-mail. This fact indicates that the teaching material may present basic errors.

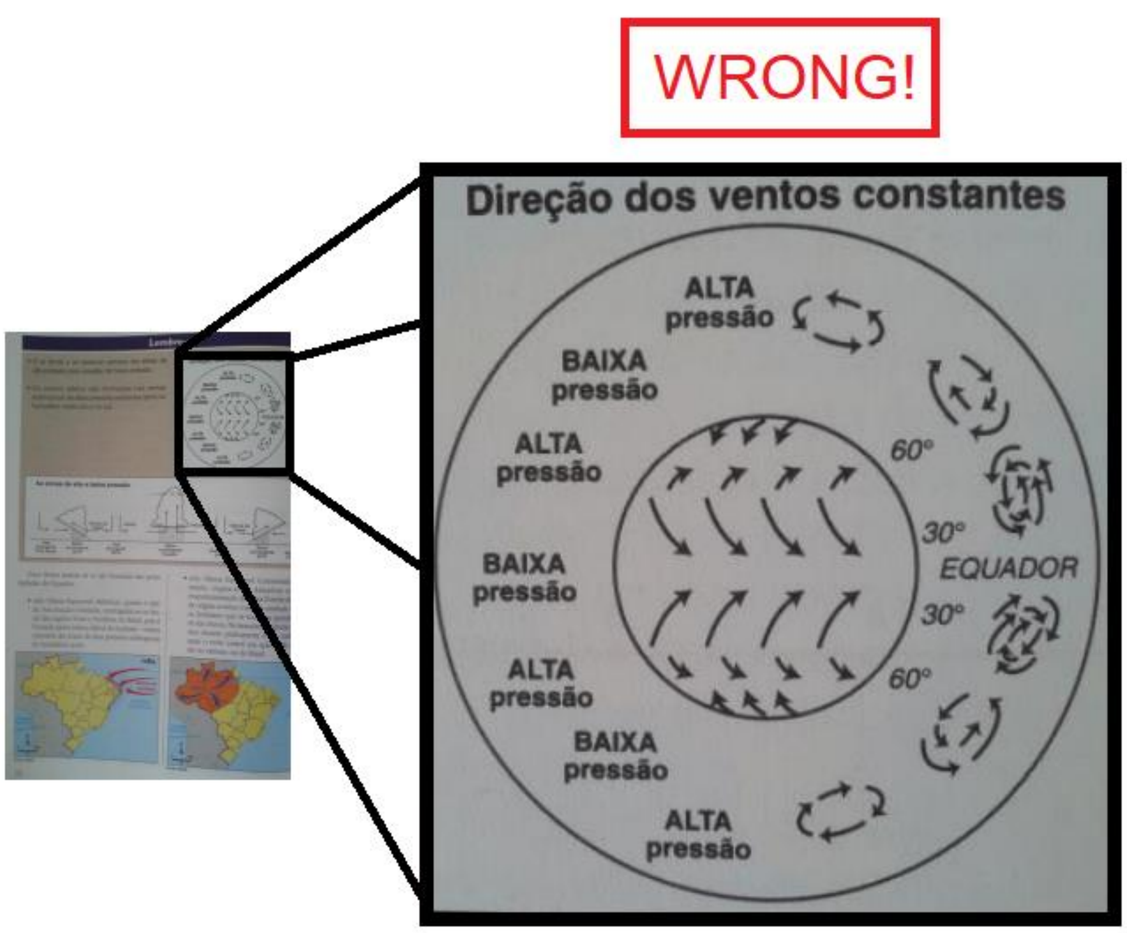

Fig. 1 – General circulation of the atmosphere with wind circulation indicated in the wrong way.
Source: author.

II – DEVELOPMENT

The following three images show the cycle of a convective cell that caused some type of severe weather through successive images (maxcappi) of weather radar, highlighting the image closest to the occurrence of severe weather. Didactically, this is an image that brings a lot of information such as the complete cell life cycle, its displacement and what are the maximum reflectivity values achieved. Indirectly it is also possible to calculate the displacement speed of the cell. These georeferenced maxcappi images are obtained by the website of the Aeronautics Meteorology Network (REDEMET) [1], which provides radar images every 10 minutes. The platform uses google maps for geographic data. Once selected the cell that originated the severe event, only its life cycle is shown, other storm cells that occurred in the weather radar screen are excluded for better visualization. You should also use an interval between radar images so that they do not overlap. The ideal is always to start from the most likely time of occurrence of severe weather. The region of the images is located in southeastern Brazil. Data were obtained with the S-band Doppler radar located in São Roque-SP at 23º35'56"S, 47°05'52"W, 1147.54m altitude. Fig. 2 shows a microexplosion event that occurred in São José dos Campos-SP on March 9, 2021 [2]. Fig. 3 (left) and Fig. 3 (right) respectively show the microexplosion events that occurred in the city of Campinas-SP on 06/05/2016 at 03:30 UTC and in Jarinú-SP on 06/06/2016 at 00:10 UTC [3].

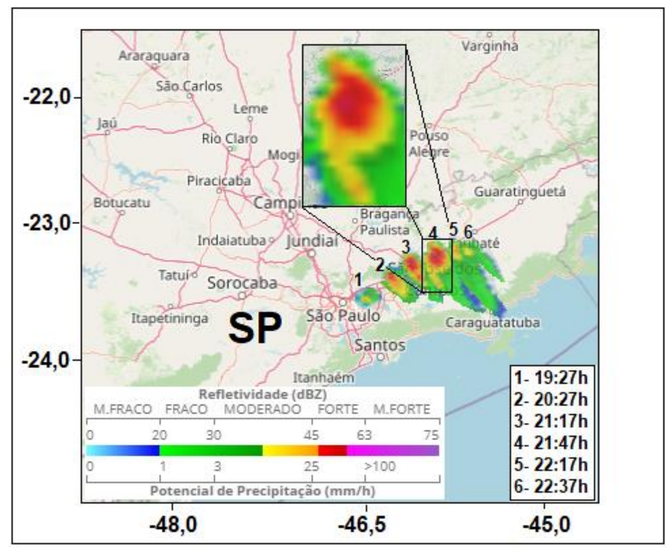

Fig. 2 – Microexplosion in São José dos Campos-SP on March 9, 2021.
Source: author.

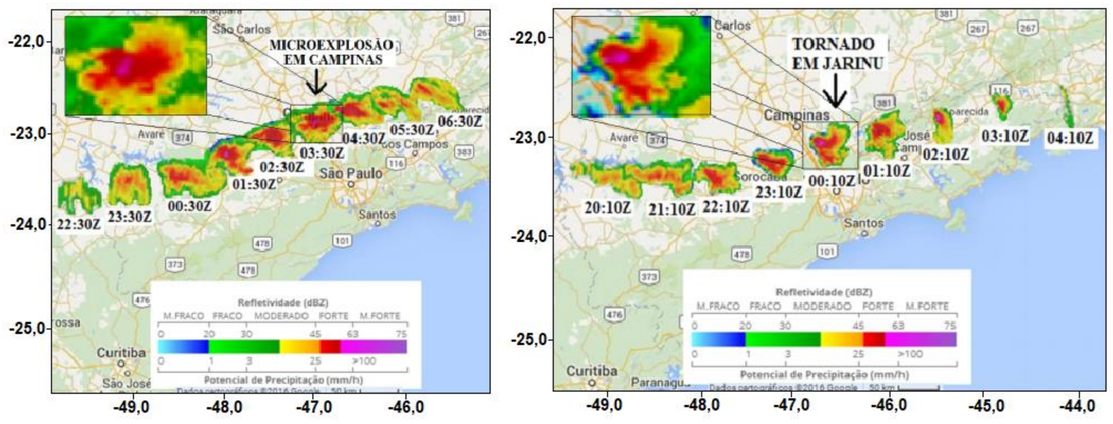

Fig 3 – (left) Microexplosion in Campinas-SP em 06/05/2016 and (right) tornado in Jarinú – SP em 06/06/2016.
Source: author.

The cell that generated the microexplosion in Campinas-SP lasted 9 hours and had an average speed of 15.8 m/s and the cell that generated the tornado in Jarinú-SP lasted 8 hours and had an average speed of 18.9 m/s.

III – CONCLUSION

Didactically an image taken properly can contain a lot of useful information for the study of storm cells responsible for severe weather.

IV – FINAL CONSIDERATIONS

Antonio P. Queiroz holds a Master's degree in Meteorology, has taught several classes in the course of training of meteorologists in Brazil and National Institute of Meteorology of Mozambique (INAM).

Cleber S. Corrêa holds a Ph.D. in Water Resources, has taught several classes in the course of training of meteorologists in Brazil and currently teaches classes at the Technological Institute of Aeronautics (ITA) in São José dos Campos – SP, Brazil.

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