

SATELLITE IMAGES VISUALIZATION ON 3D GLOBE - DSA EXPLORER

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1. INTRODUCTION

This work shows the DSA Explorer application developed to visualize satellite images and meteorologic products on a tri-dimensional virtual Earth model. The Satellite and Environmental Systems Division of the Center for Forecasting and Climate Studies (DSA/CPTEC) receive and disseminate meteorology satellite images and its derived products as well. Among these satellite images, GOES and Meteosat are the principal ones. The hardware, bandwidth and software recent advances allowed the development of more interactive web application and with better graphical processing support. These three characteristics are desirable when presenting geospatial data. Also, open standards, like Web Mapping Service, allow the interoperability of this kind of information [1]. The increase in search for satellite images by the general public encourages the development of new interactive applications. Between January and June 2015, 26,769,879 images has been downloaded from the DSA/CPTEC website.

2. THE DSA EXPLORER

The DSA Explorer (Figure 1) is a web application build with a client-side languages using the Cesium library for the 3D globe. The application also uses the N layers architecture available at DSA/CPTEC for request the images. Today, the DSA Explorer has the following features: (i) GOES and MSG images visualization; (ii) easy selection of an specific date for visualization. For now, the dataset online comprehend December 2011 until today but DSA/CPTEC has plan to goes backward until early 2000's; (iii) a "timeline" for animation of a given satellite sensor channel for a given day, allowing to monitoring the evolution of meteorologic systems; (iv) the user can adjust the brightness, contrast, saturation and gamma of any image through sliders.

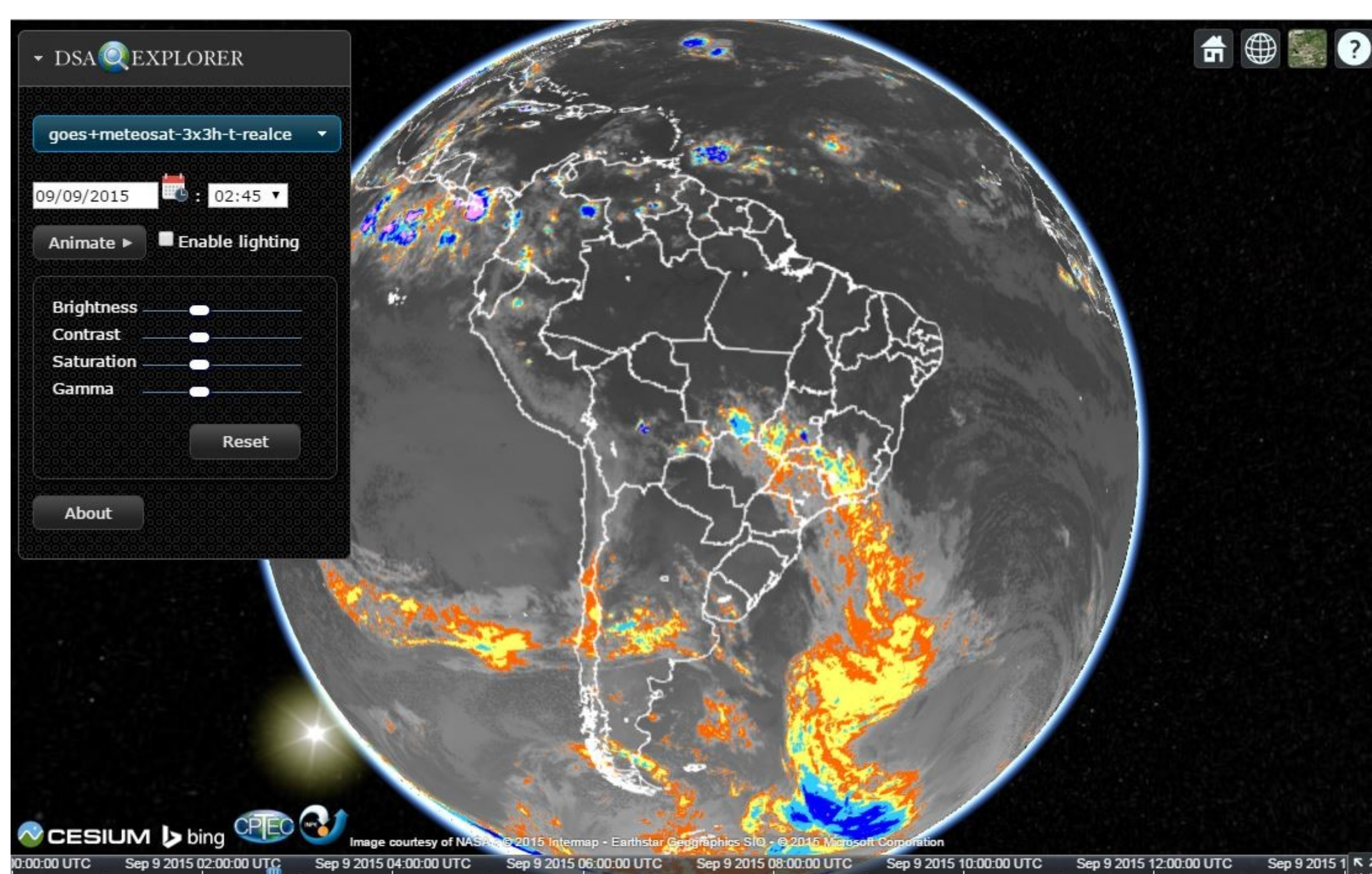


Fig. 1 – DSA Explorer 3D Globe Web Application

3. DSA ARCHITECTURE

The strategy is built the applications around the N-tier architecture [2], which partitions systems and software to enable a more flexible, building block approach to infrastructure design and growth. To do this, we use web services that provide several technological and business benefits, such as: (i) the inherent interoperability that comes with using vendor, platform, and language independent XML technologies and the ubiquitous HTTP as a transport mean that any application can communicate with any other application using Web services; (ii) versatile by design; (iii) code re-use. Web Services could provide responses in XML or JSON [3]. XML and JSON [4,5] have become the dominant formats for exchanging data on the Internet, and applications frequently need to send and receive data in many different JSON-based or XML-based formats.

The DSA Explorer requests to Web Service that perform a query in database. The response to application is using JSON format. After this, the application access the image file in a file server cluster. Figure 2 shows the DSA Explorer Architecture.

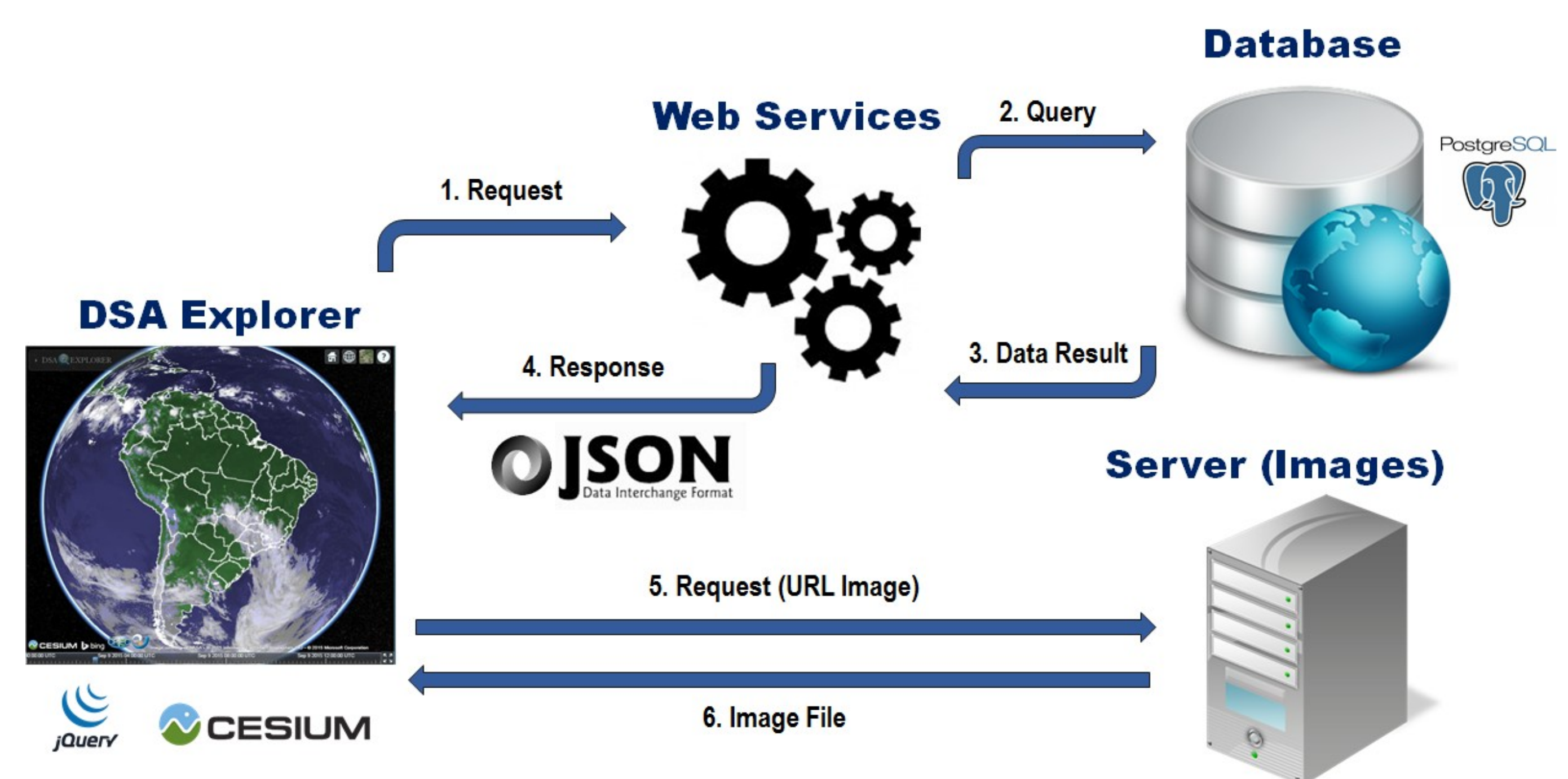


Fig. 2 – DSA Explorer Architecture

4. CONCLUSION

Dissemination of geospatial information through Web Services using JavaScript Object Notation (JSON) allows easy development of new products and application. This communication interface encapsulates the layers and the data storage framework, allowing the integration of different systems. The DSA Explorer send requests to DSA/CPTEC Web Service which returns a JSON with all informations about each images from a given date. Thus, this application comes as a friendly way to general users visualize the meteorological images produced by DSA/CPTEC.

5. REFERENCES

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ACKNOWLEDGMENT

The authors would like to thank the unconditional support given by the Center for Weather Forecast and Climate Studies (CPTEC) and National Institute for Space Research (INPE).