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BRAZILIAN PARTICIPATION IN THE COROT SPACE MISSION

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Abstract. Brazil participates in the CoRoT mission with France and other European countries. We performed software engineering, science activities and provided a ground station for data reception. A brief description of some of these contributions is presented here.

Keywords: CoRoT satellite, exoplanets, asteroseismology

1 Introduction

Brazil started participating in the CoRoT mission since 2002 by means of spectroscopic observations of seismo targets from Brazil and La Silla (Chile). A formal agreement was signed between CNES and the Brazilian space agency (AEB) in early 2003. Funding for the Brazilian participation has been secured by a wealth of federal and state public agencies and institutions as CNPq, CAPES, INPE, AEB and by universities all over the country.

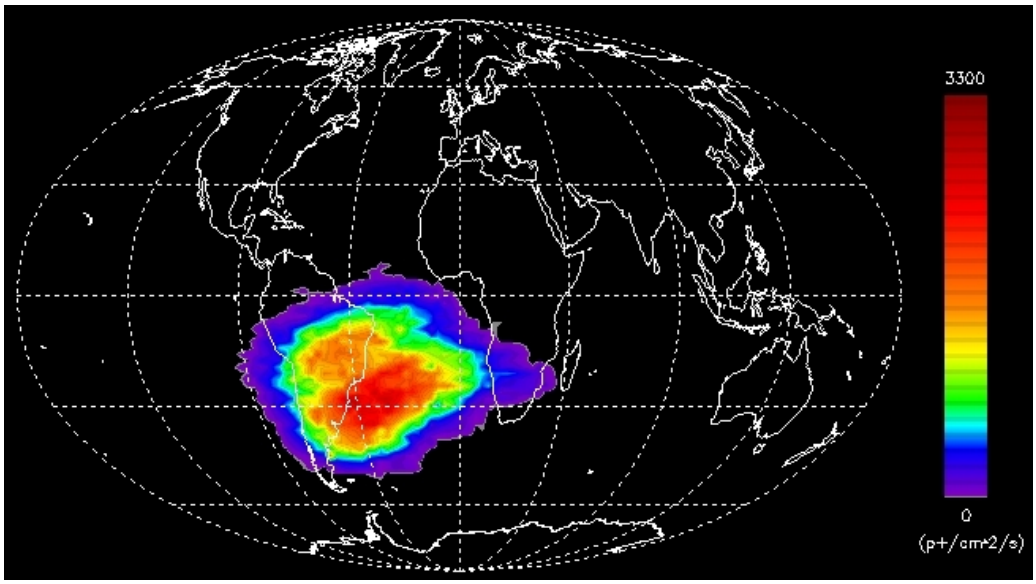

Fig. 1. Mapping the South Atlantic Anomaly with CoRoT from proton data. (Pinheiro da Silva et al. 2008)

2 Software engineering

Scientists and engineers spend from 2 to 4 years in Meudon and Toulouse observatories working in the software teams. A number of specific activities were performed by Brazilians: a) characterization of the instrument (electronic bias level, electronic gain, PSF, spontaneous generation of electrons, pixel response and proton impacts (see in Fig. 1 a determination of the South Atlantic Anomaly from proton detections by CoRoT); b) system validation and start, signal processing and instrument modeling for ground segment (PSF +Jitter, cf. Fig. 2) and noise correction (Fig. 3).

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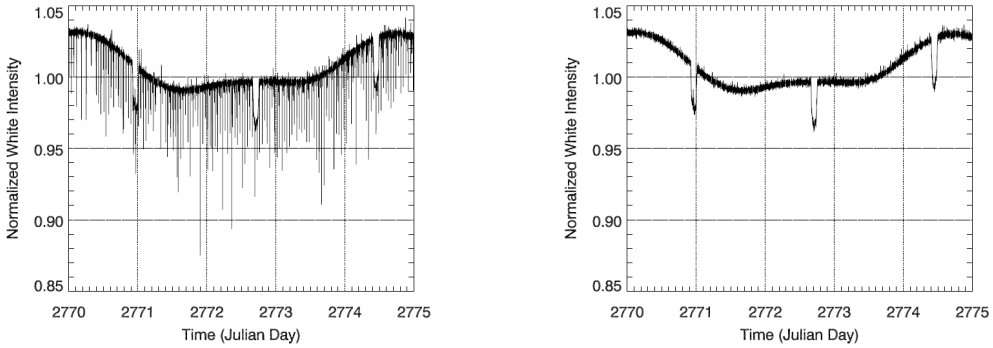

Fig. 2. Correction applied to the PSF (**left**) give spectacular results (**right**). (De Oliveira Fialho 2009)

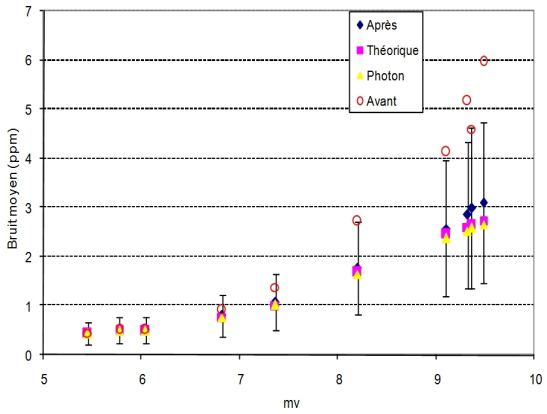

Fig. 3. Evolution of the detector noise during the corrrection procedure. Note that the average noise after the correction by means of software is quite close to the theoretical level for a large stellar magnitude range. (Auvergne et al. 2009)

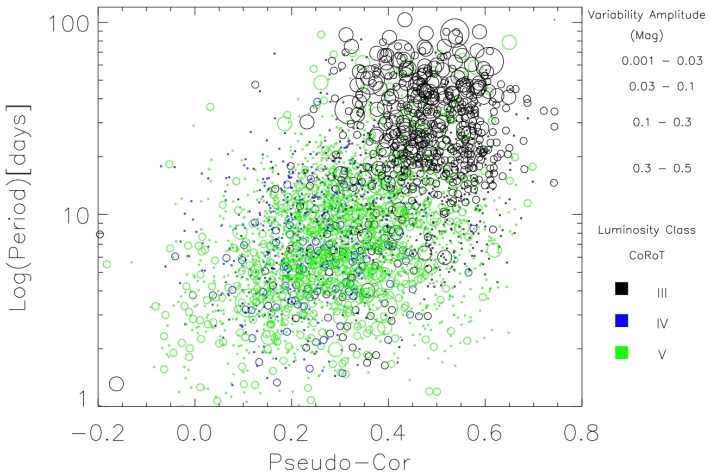

Fig. 4. Period-pseudo-color diagram for stars observed with CoRoT for which rotational periods have been estimated. The breaking effect with age is clearly seen. (De Medeiros et al. 2012)

3 Science activities

Besides the spectroscopic observations during the pre-launch phase, we leaded s series of science teams, mainly: young stars in NGC 2264 (Alencar et al. 2012), dynamics of exoplanets (Ferraz-Mello 2011), stellar seismology (Andrade et al. 2012), stellar rotation (De Medeiros et al. 2012) (see Fig. 4) and physics of stellar spots (Silva-Valio & Lanza 2011).

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