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SCIENCE OUTPUTS OF THE CDPP ON-LINE ANALYSIS TOOL AMDA

V. Génot[1], C. Jacquey[1], E. Budnik[2], M. Bouchemit[1], M. Gangloff[1], A. Fedorov[1], B. Lavraud[1], N. André[1], G. Fruit[1], P. Louarn[1], C. Harvey[1], E. Pallier[1], E. Penou[1], R. Hitier[3], B. Cecconi[4], F. Dériot[5], D. Heulet[5], J.-L. Pinçon[6] and B. Besson[5]

Abstract. According to the Virtual Observatory paradigm the CDPP developed an on-line data mining tool, AMDA (Automated Multi-Dataset Analysis) : it is a web-based facilities for analyzing on-line space physics data coming from its own local database as well as remote ones (CDAWeb, CAA, MAPSKP, THEMIS database). This tool allows the user to perform on-line classical manipulations such as data visualization, parameter computation or data extraction. AMDA also offers innovative functionalities such as event searching using the data from multiple sources in either a visual or an automated way, the generation, exploitation and management of time-tables, or event lists. This presentation will focus on scientific analyses performed by AMDA users in recent years.

Keywords: databases, virtual observatory, analysis tool, space physics

1 Introduction

While the astronomy and astrophysics domain are relatively advanced regarding their implication in the creation of Virtual Observatories (VO), space and planetary physics are just beginning their first steps into this effort (Harvey et al. 2008). At the French and European level, it is one of the goals of CDPP (Centre de Données de Physique des Plasmas) to encourage the space physics community to participate in this project. Recently, the CDPP opened a new web-based service called AMDA (Jacquey et al. (2009)), aimed at being the CDPP contribution to the Virtual Observatory. This poster describes a few scientific use cases of AMDA.

2 AMDA uses cases

To date AMDA has been use for scientific analysis in the diverse fields of magnetosheath, plasma sheet, and turbulence physics, space weather and comparative planetology, as described in the poster which may obtained at the CDPP web site. In the following we detailed a particular use case.

On Figure 1 is displayed two different ways of finding events with AMDA, either by visual inspection (steps 1a and 1b) or by automatic detection of events (steps 2a and 2b). The use case is the detection of magnetopause crossings at geosynchronous orbit using LANL satellites data. In this aim we define the parameter $C_{\rm MPX}$ (see Figure 1) which is expected to present a positive/negative spike for inbound/outbound crossings and the typical time scale of the magnetopause crossing is given by $1/|C_{\rm MPX}|$. From trial and error we found that $|C_{\rm MPX}| > 0.05$ is an adequate condition to efficiently select magnetopause traversals.

For the visual inspection method, the user may plot $C_{\rm MPX}$ (top panel of Figure 1b) together with other parameters (here T and N). By mouse click he/she may select periods of time where $C_{\rm MPX}$ peaks which marks magnetopause crossings. This time intervals may be recorded for future use in a time table. Alternatively the user can start a systematical search for events by asking AMDA to look for all interval satisfying the condition $C_{\rm MPX} > 0.05$ (Figure 2a). This conditional search procedure results also in a time table which is illustrated on Figure 2b.

[1] CESR, Universitté de Toulouse (UPS) & CNRS (UMR5187), 9 av. colonel Roche, 31400 Toulouse, France
[2] Noveltis, 2 av. de l'Europe, 31520 Ramonville Saint-Agne, France
[3] Co-Libri, 11300 Pauligne, France
[4] LESIA, Observatoire de Paris-Meudon, 5 place Janssen, 92190 Meudon, France
[5] CNES, Centre Spatial de Toulouse, 18 avenue E. Belin, 31401 Toulouse, France
[6] LPCE, Laboratoire de Physique et Chimie de l'Environnement, 45071 Orléeans, France

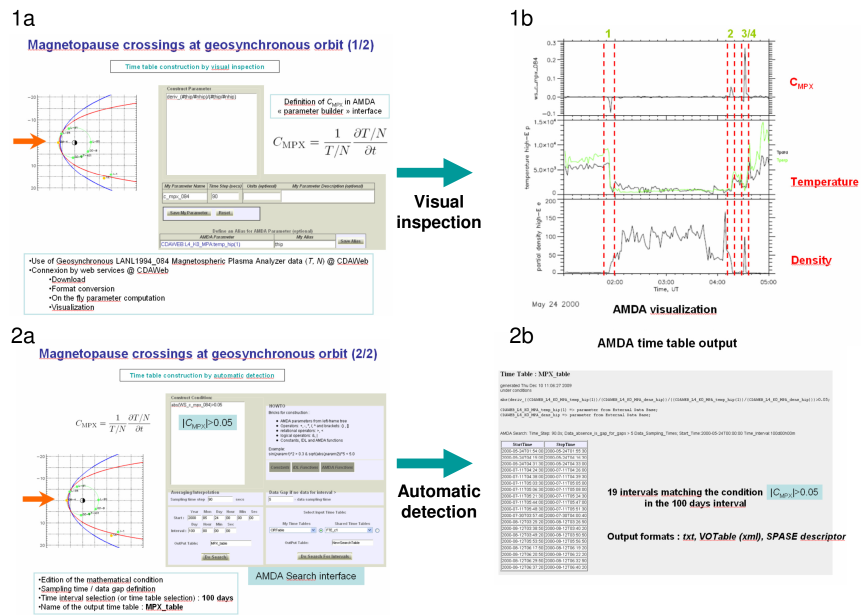

Fig. 1. Two ways for producing time tables in AMDA : visual inspection and automatic detection in the case of magnetopause crossings at geosynchronous orbits.

3 Conclusions

Detailed presentations and uses of AMDA may be found in the literature (see for instance André et al. (2009); Génot et al. (2009); Jacquey et al. (2010)) or directly on the CDPP web site, `http://cdpp.cesr.fr`.

References

André, N., Cecconi, B., Budnik,et al. 2009, SF2A-2009: Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics, held 29 June - 4 July 2009 in Besançon, France. Eds.: M. Heydari-Malayeri, C. Reylé and R. Samadi, p.231

Génot, V., Jacquey, C., Bouchemit, et al. 2009, Advances in Space Research, Volume 45, Issue 9, p. 1145-1155

Jacquey, C., Génot, V., Budnik, et al. 2010, The Cluster Active Archive, Studying the Earth's Space Plasma Environment. Edited by H. Laakso, M.G.T.T. Taylor, and C. P. Escoubet. Astrophysics and Space Science Proceedings, Berlin: Springer, p.239-247

Harvey, C., Gangloff, M., King, T., et al. 2008, Earth Science Informatics