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Automatic detection and characterization of plasma bubbles and other low latitude ionospheric disturbances in DEMETER data

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The night time low latitude ionosphere is subject to a number of specific disturbances such as small scale plasma irregularities, plasma blobs and plasma bubbles. These later appear as highly structured and deep plasma density depletions that arise very rapidly after sunset and may last a few hours. They feature by far the largest plasma disturbances at equatorial and tropical latitudes and have been and still are a very active domain in ionospheric research both due to their fundamental interest in the field of plasma instabilities and also because the plasma disturbances are a major difficulty encountered by radio-communications over a wide frequency range. In the frame of the French ANR IODISSEE project, we have developed a dedicated automated algorithm to process plasma and wave data from the Survey modes of DEMETER and retrieve events showing significant disturbances of the low latitude night time ionosphere. The first objective was to derive an algorithm based on a simplified neural network approach to detect and characterize the various types of disturbances and run it on the whole DEMETER data base that covers more than 6 years of data. The poster will describe the DEMETER data that have been used and the criteria that were set-up to detect the various specific events. Preliminary results from a statistical study of the occurrence of plasma bubbles during the very deep solar minimum period between 2005 and 2009 will be presented, showing the annual and seasonal variation of occurrence of plasma bubbles.