EP 18 Poster-Session I: CAWSES, Atmosphäre und erdnaher Weltraum

Zeit: Freitag 09:00–19:00 Raum: Poster TU BH

EP 18.1 Fr 09:00 Poster TU BH

Ionospheric imaging based on the assimilation of GPS observations — •Claudia Stolle[1], Schlüter Stefan[2], Heise Stefan[1], Jacobi Christoph[3], Jakowski Norbert[2], and Lühr Hermann[1] — [1]GFZ Potsdam, Telegrafenberg, 14473 Potsdam — [2]Institut für Kommunikation und Navigation, DLR Neustrelitz, Kalkhorstweg 53, 17235 Neustrelitz — [3]Institut für Meteorologie, Universität Leipzig, Stefanstr. 3, 04103 Leipzig

The imaging of electron density fields using ionospheric observations of the Global Positioning System (GPS) has become a rapidly developing and powerful ionospheric remote sensing method. These imaging techniques are based on the assimilation of line-of-sight measurements of Total Electron Content (TEC) along the signal paths of GPS radio waves into climatological background models of the ionospheric electron density distribution. Here, we apply a three-dimensional imaging tool, which assimilates calibrated GPS TEC observations into a combined International Reference Ionosphere/Global Core Plasma model. The GPS database consists of data from ground-based receivers and of ionospheric radio occultations realised onboard the CHAMP satellite. We will present the outcomes of validating the assimilation with independent data, and discuss assimilation results from a case study.

EP 18.2 Fr 09:00 Poster TU BH

Bestimmung mesosphärischer Turbulenz nach Radarbeobachtungen auf 3 MHz — •Norbert Engler[1], Ralph Latteck[1], Werner Singer[1] und Wayne K. Hocking[2] — [1]Leibniz-Institut für Atmosphärenphysik an der Universität Rostock e.V., Schlossstr. 6, D-18225 Kühlungsborn — [2]Univ. of Western Ontario, London, Ontario, Canada , N6A 3K7

Das Saura MF-Radar (3.17 MHz) ermöglicht das Studium von atmosphärischer Turbulenz mit verschiedenen Experimentkonfigurationen. Das Radar befindet sich in der Nähe des ALOMAR-Observatoriums in Nordnorwegen (69°N, 16°E) und erlaubt kontinuierliche Messungen der Turbulenz in einem Höhenbereich von 40-100 km.

Die turbulente kinetische Energiedissipationsrate wird aus der gemessenen spektralen Breite abgeleitet. Es wird die Dual-Beamwidth-Methode mit einer näherungsweisen Bestimmung unter Einbeziehung des Hintergrundwindes sowie mit einer exakten Methode unter Verwendung des Strahlungsdiagramms, des Hintergrundwindes und der Aspektempfindlichkeit verglichen. Turbulente Energiedissipationsraten nach diesen 3 Methoden wurden in einem Experimentzyklus gewonnen und greifen auf einen Satz von akkumulierten Radarechos zurück. Die vergleichende Analyse zeigt die Vorteile und auch die Limitierungen der einzelnen Methoden.

Unterschiede in der mesosphärischen Zirkulation während des polaren Sommers und Winters und die hierdurch geänderte Ausbreitung und Brechung von Trägheitsschwerewellen spiegeln sich in den ermittelten turbulenten Energiedissipationsraten in der Mesosphäre wieder.

EP 18.3 Fr 09:00 Poster TU BH

Cluster observations of thin current sheets at the Earth's magnetopause — •Evgenyi Panov[1], Jörg Büchner[1], Axel Korth[1], Markus Fränz[1], Bernd Nikutowski[1] und Karl-Heinz Glassmeier[2] — [1]Max-Planck-Institut für Sonnensystemforschung — [2]Technische Universität Braunschweig

We use the unique opportunity of the four-satellite space mission CLUSTER, which for the first time allows the discrimination of spatial from temporal structures, to determine the thickness, motion and fine structure of magnetopause currents. In particular we analyzed events of subsequent multiple crossings of the magnetopause current sheet. We obtained that the thickness of the magnetopause current sheet can vary considerably within minutes, sometimes becoming as thin as an ion gyro-radius. Such thin current sheets can be understood only by a kinetic physical approach, e.g. Vlasov-code simulations [Silin and Büchner, 2004]. The, this way theoretically predicted lower-hybrid drift waves were, indeed, observed at the magnetospheric side of the magnetopause. Consequences of their occurence for anomalous diffusion due to wave particle interactions are considered.

EP 18.4 Fr 09:00 Poster TU BH

THE SOLAR WIND CALIBRATION LABORATORY IN KIEL — •Michael Stalder, Christian Seigies, and Robert Wimmer-Schweingruber — Leibnizstrasse 11, 24118 Kiel

A new ECR ion source (ECRIS) using permanent magnets only has been developed for the use in a solar wind calibration laboratory at the University of Kiel. The main goal of the new ECRIS is to produce highly charged ions such as Fe^{20+} to simulate the solar wind. The ECRIS and an 90° sector magnet are placed on a high voltage platform, allowing the static acceleration of ions in the energy rage of 1keV/q .. 450keV/q. We designed an all permanent magnet system using additional iron rings to shape the magnetic field. A plateau in the axial magnetic field strength Bz leads to a big resonance volume. The form of the Bz field plateau can be adjusted by moving the iron rings in the axial direction. Changing the iron rings leads to resonance frequencies in the range of 10GHz to 14GHz. Our magnet design leads to a simple magnet geometry and a high axial mirror field strength of $B_{zMax} = 1T$. The main components for the new solar wind laboratory in Kiel are built and assembled. The laboratory will be ready to use at the end of 2005.

EP 18.5 Fr 09:00 Poster TU BH

SOLAR ZENITH ANGLE AND MERGING ELECTRIC FIELD CONTROL OF FIELD-ALIGNED CURRENTS: A STATISTICAL STUDY OF THE SOUTHERN HEMISPHERE — •Hui Wang[1,2], Hermann Luehr[1], and ShuYing Ma[2] — [1]GeoForschungsZentrum, Potsdam, Germany — [2]Dept.of Space Physics, College of Electric Information, Wuhan Univeristy, P. R. China

Two years' high-resolution CHAMP FGM measurements are used to study the statistical features of the field-aligned currents (FACs) in the southern polar ionosphere, which provide a double coverage of the seasons and about a six-fold coverage of all local times. Special attention is paid to the influence of the solar illumination induced conductivity on the morphology features of FACs on normal conditions when merging electric field is not exceeding 2 mV/m. It shows that the solar influence on the conductivity strongly controls the FAC densities at the dayside. A linear relation between the conductivity and the peak FAC density exists. Solar elevation does not affect the nightside FAC density, the conductivity is dominated by the precipitation of energetic particles carrying the field-aligned current. On the dayside a systematic difference of the footprint latitude between sun-lit and dark conditions emerges. Based on the above results, we may suggest that the sources of Birkeland currents on the dayside behave like a voltage source, while on the nightside possibly like a current source.

EP 18.6 Fr 09:00 Poster TU BH

Upgrading the Kiel Neutron Monitor — •Christian T. Steigies, Andreas Klassen, Klaus Röhrs, Christiane Helmke, and Robert F. Wimmer-Schweingruber — IEAP, Christian-Albrechts-Universität zu Kiel

The Neutron Monitor in Kiel is one of the longest operating Neutron Monitors in the world, it has been operating continuously since the IGY 1957. The original counting electronics was upgraded in the mid-90's in collaboration with the IZMIRAN group, using a redundant arrangement of standard PCs. Even though this setup has been operating without any problems for the last ten years, the hardware needs replacement to prevent data loss in case of failure of the aging hardware. For this we are preparing a new set of data acquisition electronics that will be set up in parallel to the existing electronics. A programmable automation controller (PAC) is the centrepiece of the upgraded electronics. The PAC runs a real-time OS and can be programmed with LabVIEW. We present data from the Kiel Neutron Monitor for the October/November 2003 events, as well as others, which demonstrate the high resolution and sensitivity of the currently existing system. By using optimal-filtering techniques, we determine onset and decay times of these ground level events (GLE). We investigate the desirability of higher time resolution and its impact on the reliability of the determination of onset times.