Diffusion of “Corks” Over the Solar Surface
A.M. Title (LPARL), G.W. Simon (Phillips Labs), N.O. Weiss (Cambridge Univ.)

Test particles in flow fields generated by correlation tracking of movies of the solar surface and kinematic models of the solar surface quickly collect in stagnation points of the flow fields and remain there. Test particles do not form a quasi-stable network pattern. The diffusion coefficients generated from a set of kinematic models with a range of cell sizes and lifetimes are not proportional to the cell size squared divided by the cell lifetime as commonly assumed. Reasonable estimates of cell sizes and lifetimes yield diffusional coefficients that are lower than the 600 km²/s used by Sheeley and his collaborators in their surface diffusion models. We conclude that: 1) The appearance of plages and enhanced network can not be explained by adjustment of the cell sizes or surface velocities; and 2) diffusion is not sufficient to explain the appearance of plages and enhanced network.

Solar Coronal Magnetic Field Topology Inferred from High Resolution Optical and X-ray Movies
T. Tarbell, Z. Frank, N. Hurlburt, M. Morrison, R. Shine, and A. Title (Lockheed PARL), L. Acton (Montana State Univ.)

We are using high resolution digital movies of solar active regions in optical and X-ray wavelengths to study solar flares and other transients. The optical movies were collected at the Swedish Solar Observatory on La Palma using the Lockheed tunable filtergraph system, in May - July, 1992. They include longitudinal and transverse magnetograms, H-alpha Doppler and intensity images at many wavelengths, Ca K, Na D, and white light images. Simultaneous X-ray images from Yohkoh are available much of the time. We are learning several ways to establish the connectivity of some coronal magnetic field lines. Some of the clues available are: magnetic footpoint polarities and transverse field directions; H-alpha filaments and loops seen in several wavelengths; proper motion and Doppler shifts of blobs moving along field lines; footpoint brightening in micro-flares; spreading of flare ribbons during gradual phases of flares; X-ray morphology and correlations with H-alpha; and draining of flare loops. Examples of each of these will be shown on video.

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Emergence of Twisted Flux Tubes in the Solar Atmosphere
R. Matsumoto, T. Tajima (UT Austin), K. Shibata (NAOJ)

Solar coronal loops observed in soft X-rays often show twisted structures. Sometimes, magnetic loops unwind after the topological change of magnetic field lines (McAllister et al. 1992). Since twisted flux tubes have more free energy than untwisted loop, when they emerge into the corona and interact with other loop or overlying magnetic fields, the release of magnetic energy will lead to energetic events such as flares, jets, and prominence eruptions.

A Comparison of the Disappearing Ionospheres with Solar Minimum Ionospheres on Venus from Pioneer Venus Orbiter Measurements
J. Kar, J.M. Grebowsky, R.E. Hartle (NASA/GSFC), P.A. Cloutier (Rice U)

Despite the slow rotation of Venus, the nightside ionosphere is generally quite robust (10^7 - 10^8 cm⁻³) at solar maximum except during very high solar wind dynamic pressure conditions. During the later conditions, the ionosphere is very depleted (disappearing ionospheres, DI) and these states are expected to be analogous to the typical solar minimum conditions on the nightside of Venus. The last in situ ionospheric data from the Pioneer Venus Orbiter were obtained recently (July-October, 1992) during its entry phase when the solar activity was approaching a minimum level. The Orbiter ion mass spectrometer measurements will be used to compare the relative ion abundances during DI’s and the decreased solar activity level. Incidence of superthermal ions during these two regimes will also be compared.

The Statistics of the CD-ROM Digital Archive of the International Halley Watch
D.A. Kipling Smith III (NASA/GSFC), E. Grayzek (UofMD/PDS-SBN), M.B. Niedner (NASA/GSFC)

The digital Archive of the IHW is a collection of 25 CD-ROMs containing the totality of data submitted by over 1500 observers of Comet Halley during its most recent apparition. The remote (ground-based) data was collected into nine disciplines of astronomical observations: Astrometry, Infrared Studies, Large-Scale Phenomena, Near Nucleus Studies, Photometry, Radio Studies, Amateur Observations, Meteor Studies, and Spectroscopy. The space data is being assembled separately on the last two disk of the series (HAL-0025 and HAL-0026).

This poster will present statistics about the distribution of observations made, when they were made, and where they were made. The basic software tools for using the CD-ROMs, which have been included on the disks, will be described. Besides the actual observations, a large amount of documentation detailing the data collection and data archiving are included on the CD-ROMs. In order to facilitate searching through the 15 Giga bytes of data a number of general and discipline specific index tables have been provided.

The time period covered was from December 1981 through April of 1989. There were over 60,000 individual observations recorded in 23 subsets.

The CD-ROMs are being distributed to all of the contributors who asked for them and to major astronomical facilities around the world. Additional copies can be obtained through the NASA Planetary Data Systems Small Bodies Node at the University of Maryland (psds@astro.umd.edu) and/or NASA National Space Sciences Data Center (request@sssc.gsfc.nasa.gov)