line of sight. Inclination is determined by a least-squares fit of observed magnetic fields to a simple projection model, and is found to depend on polarity and to change with the solar cycle. Leading and following polarities are tipped towards each other by about 9° and have an overall net tilt in the direction of rotation (to the west) of 0.6°. New cycles are seen to begin at high latitudes and to grow through the lower latitudes over approximately 3 years, providing evidence for an extended cycle length of 16-18 years.

penumbral boundary just before the Evershed flow disappears at the penumbral boundary. Inward, the obscuration increases and penumbral line profiles have a decreasing contribution from the deeper flow which shows roughly constant proper motions with decreasing contrast. The visibility of the proper motions in dopplergrams can be qualitatively understood as an increased contribution to the composite line profile from the flow when a brighter structure is present. This is consistent with the observed correlation of brightness with increased doppler signal.

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4.03 Diffusion of “Corks” Over the Solar Surface
A.M. Title (LPARL), G.W. Simon (Philips 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 when the initial sources are bounded in time and space. Continuous introduction of new test particles are required to maintain a network. 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. However, the diffusion coefficients that these models generate are higher than suggested by the size and lifetime of supergranules. We conclude that: 1) the appearance of plages and enhanced network can not be explained by adjustment of the cell sizes or surface velocities; 2) Diffusion is not sufficient to explain the appearance of plages and enhanced network; and 3) In quiet sun diffusion by supergranulation maybe enough to generate diffusion coefficients of about 500 km²/s.

4.05 A Multiwavelength Portrait of a Solar Active Region
S. M. White, M. R. Kundu and N. Gopalswamy (U. Md.)

During the SMM/International Solar Month campaign in September 1988 a large number of observatories provided coordinated observations of solar phenomena. In this paper we collect together data from a number of sources for a simple region near disk center on 1988 Sep. 17. The region was dominated by a large round spot. We present SMM UVSP and XRP images, SOUP data, and magnetograms from several observatories; magnetic field extrapolations are presented to estimate the coronal magnetic field structure, and these are compared with high-precision-limited radio observations from the Very Large Array which outline the magnetic field strength in the corona above the active region. The different wavelengths act as diagnostics of material at different temperatures in the solar atmosphere, and we compare the distribution of these plasmas over the active region.

4.06 The Quiet Sun Network and Solar Irradiance Variations
K. P. Topka, T. D. Tarbell, A. M. Title (LPARL)

Photometric measurements of the photospheric contrast of magnetic elements contained within the quiet sun network has now been obtained from the Swedish Solar Observatory, La Palma. These data were taken with the Lockheed tunable filter instrument using a CCD camera, and include continuum images of high spatial resolution (up to 0.4°), and magnetograms (up to 0.6°), which have been registered to an accuracy of better than 0.1°.

The measurements reveal that the center-limb contrast function for network is significantly different from that of active region plage. At disk center plage is dark (negative contrast: intensity less than the surrounding quiet sun), while the network is bright. Close to the limb, however, plage is over 3 times brighter on average than network.

From these measurements it is possible to construct improved models of solar irradiance variations based on this sort of proxy data. Our results indicate that the changes in the area of the network during the 11-yr solar cycle is insufficient to explain long term solar irradiance variations.

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