

Application of feature recognition technique in the investigation of magneto-convection on the solar surface

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We show the recent feature recognition technique and its benefits in the investigation of magneto-convection on the solar surface using observational and numerical approaches.

The magneto-convection on the solar surface is important not only as a trigger of many surface energetic events, e.g. solar flare, jet, and X-ray bright point, but also as an actual example of the most detailedly observed and numerically simulated magneto-convection on the stellar surface owing to its closeness to the earth. However, the elements of magneto-convection (<1,000km), the basic convective cells and magnetic patches formed by convective motion, are much smaller than solar global scale (~70,000km). It means that we need large field of view to catch up enough number of structures simultaneously with high spatial resolution to capture such small scale structures. Thanks to the improvement of engineering technique for satellite observation and computers for numerical calculation, we are now able to catch such a large scale structure at the same time. However, the new difficulty, how to investigate statistical characters of convective cells and magnetic structures in such huge data sets, has just shown up in the analysis.

Because of this situation, feature recognition and tracking technique is now focussed on. In this presentation, we want to introduce the auto-recognition and tracking code of magnetic patches and convective cells on the solar surface. Further it is shown that the statistical characters obtained through the analysis of observational data and numerical calculation data based on the auto-recognition and tracking code. We want to note that the feature tracking technique drastically improve statistics of the analysis drastically. We also want to discuss about the applicants of feature tracking technique with the scientists in the other fields though this collaborative session.

Keywords: the Sun, magneto-convection, feature recognition