IMAGE PROCESSING IN THE PETABYTE ERA

Preface

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The *Fifth Solar Image Processing Workshop* (SIPWork V) was held in Les Diablerets, Switzerland in September 2010. This meeting brought together researchers in solar physics, image processing, and computer vision, and it focused on the challenges of understanding and predicting the behavior of our Sun in the petabyte era of solar physics ushered in by the *Solar Dynamics Observatory* (SDO). Solar image processing is taking a central role in reducing SDO and other data into useful information about the underlying physics.

In addition, many other facilities, such as the *Solar Terrestrial Relations Observatory* (STEREO), the *Reuven Ramaty High Energy Spectroscopic Imager* (RHESSI), the *PRoject for OnBoard Autonomy-2* (PROBA2), *Picard*, and the H-α network each observe the Sun differently and so present varied and significant challenges when applying computer-vision techniques to help understand the physics of the Sun.

This topical issue – *Solar Image Processing in the Petabyte Era* – continues a series of topical issues in *Solar Physics* based, in large part, on the presentations at the Solar Image Processing Workshops (Gallagher *et al.*, 2005; Young, Ireland, and Leibacher, 2008; Ireland, Young, and Leibacher, 2010). It includes work presented at SIPWork V as well as

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other solicited articles that lie within the scope of SIPWork V. The articles are ordered by topic:

 i) automated tools,
 ii) prediction of solar phenomena,
iii) methods that improve our ability to determine information on solar phenomena, and
iv) three-dimensional structure reconstruction.

The local and scientific organizing committees of SIPWork V thank NASA's Heliophysics Division, the European Space Agency, and the University of Applied Sciences Northwestern Switzerland for their support for this meeting, without which it would not have been possible. We would also like to thank all those who participated in SIPWork V for making it a stimulating and engaging workshop. Finally, we would like to thank the authors and referees who helped make this topical issue possible.

References

Gallagher, P.T., Berghmans, D., Aschwanden, M.J., Engvold, O., Harvey, J.W., Svestka, Z., 2005, Frontiers in solar image processing. *Solar Phys.* **228**, 1. ADS:2005SoPh..228....1G. doi:10.1007/s11207-005-0618-4.
Ireland, J., Young, C.A., Leibacher, J.W., 2010, A topical issue on solar image processing and analysis. *Solar Phys.* **262**, 233. ADS:2010SoPh..262..233I. doi:10.1007/s11207-010-9532-5.
Young, C.A., Ireland, J., Leibacher, J.W., 2008, A topical issue on solar image analysis and visualization. *Solar Phys.* **248**, 211. ADS:2008SoPh..248..211. doi:10.1007/s11207-008-9168-x.