Space Weather and Rail: Findings and Outlook
Space weather caused by solar activity can disrupt and damage critical infrastructures in space and on the ground. Space-weather impacts to the power grid, aviation, communication, and navigation systems have already been documented. Since society relies increasingly on the services these critical infrastructures provide, awareness of the space weather threat needs to be increased and the associated risks assessed. While most research on impacts of space weather focuses on the power grid, space weather can also affect rail systems, leading to disruptions and potential safety risks. Therefore, it is crucial to improve our understanding of space weather impacts on rail systems to ensure the safety and reliability of this mode of transportation.
grid, the Global Navigation Satellite System (GNSS), and aviation, railway networks are also a potential area for concern. Anomalies in signalling systems have been observed during geomagnetic storms, and rail transport depends on power, communications, and progressively on GNSS for timing and positioning. In order to raise awareness of this topic, and to further explore the vulnerability of rail systems to space weather, the European Commission’s Joint Research Centre, the Swedish Civil Contingencies Agency, the UK Department for Transport, and the US National Oceanic and Atmospheric Administration jointly organised the “Space weather and rail” workshop in London on 16-17 September 2015. The workshop was attended by representatives from the railway sector, insurance, European and North American government agencies, academia, and the European Commission. This report presents the main findings and conclusions of this workshop.