PRECONVECTIVE SOUNDING ANALYSIS USING IASI AND SEVIRI
In response to CGMS recommendation 35.13

EUMETSAT is investigating the possibilities of advanced sounding for analysing convective instability of the atmosphere, particularly utilising information from the hyper-spectral sounder IASI on Metop-A. The idea is to obtain initial temperature and humidity information for the MSG-2 SEVIRI based Global Instability Index (GII) from collocated measurements from IASI. All case studies indicated the potential of the method. Some problems were detected with the moisture information, that are currently being investigated.

CGMS is invited to comment and to provide the suggestions with a view to the new geostationary satellite missions that are currently developed.

Preconvective Sounding Analysis using IASI and SEVIRI

1   INTRODUCTION

With recommendation 35.13 CGMS members were encouraged to present papers demonstrating the possibilities of advanced sounding for analysing convective instability of the atmosphere, particularly utilising information from the hyper-spectral sounders AIRS and IASI.

EUMETSAT is operationally generating the Global Instability Index (GII) product, based on Meteosat-9 SEVIRI observations. The GII is an airmass parameter indicating the stability of the clear atmosphere. The usefulness of this product has been demonstrated in many nowcasting applications in particular to identify regions of potential severe thunderstorms and related hazardous weather. GII is an NRT product from MSG provided by EUMETSAT every 15 minutes via EUMETCast. Figure 1 shows an example of the GII product contents for the entire MSG field of view.

The MSG based GII retrieval currently uses forecast profiles from the European Centre of Medium Range Weather Forecasts (ECMWF) as first guess or background profiles. EUMETSAT is currently investigating the possibility to obtain initial temperature and humidity information from collocated measurements from the hyperspectral Infrared Atmospheric Sounding Interferometer (IASI) instrument on EUMETSAT's polar orbiting Metop-A satellite. Temperature and moisture profiles are derived from IASI on an orbital basis and disseminated to the users via EUMETCast in near real time.

In first test case studies temperature and moisture profiles derived from the IASI soundings were used as initial input to the GII retrieval, where the temporal evolution of the air mass properties can then be recorded by the geostationary MSG observations. The algorithm used is EUMETSAT IASI Level 2 Product Processing facility (PPF) version 4.3. All case studies indicated the potential of the method and showed some features of the original instability information being reproduced, which is promising. Some problems were detected with the moisture information available in the lower troposphere, which did not allow concluding at this time. The reasons are currently being investigated.
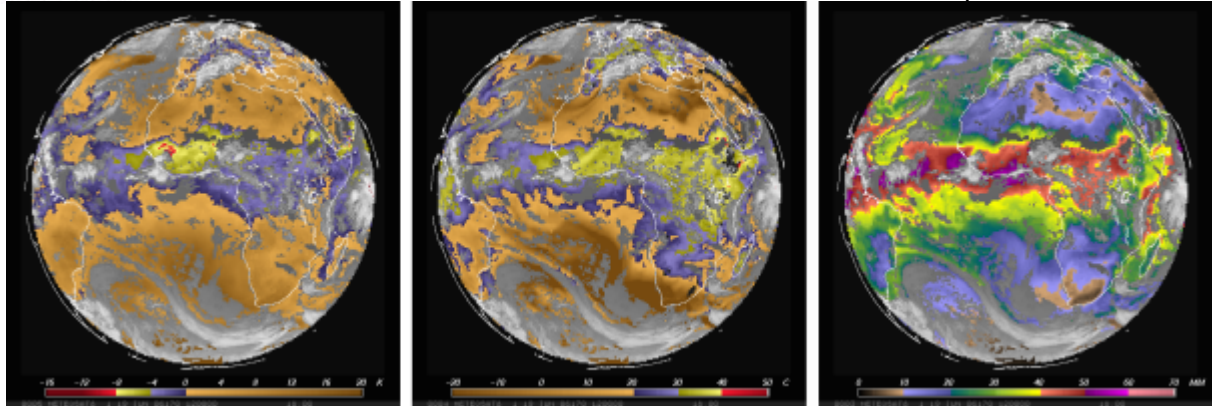
Figure 1: Example of the MSG GII product, currently provided as averages over 15 x 15 MSG pixels. The product contains the Lifted Index (left), the K Index (centre) and the Total Precipitable Water content (right).