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**The analysis of development of cryogenic
processes in northern part of Russia
(primary results)**

Introduction

Recently, an application of remote sensing appears to be one of first priority directions for solution of various problems. It is useful for geological survey and prospecting, ecological problems caused by man's impact, permafrost monitoring, etc. The last one is especially important for Russia, of which 65% territory is undergone permafrost phenomena.

It is well known that permafrost is quite sensitive to climatic changes and obviously responds to both seasonal and long-term climate fluctuations. Global warming may cause soil defrosting, surface collapse, cryogenic processes (thermokarst, thermoerosion, solifluction, etc.). It may become danger for constructions built in belief that permafrost basement is long-term stable. *The Republic of Sakha (Yakutia) includes the most problematic territories.*

Introduction (count.)

European Space Agency has provided 5 images (including interferometric pairs) of ENVISAT ASAR from:

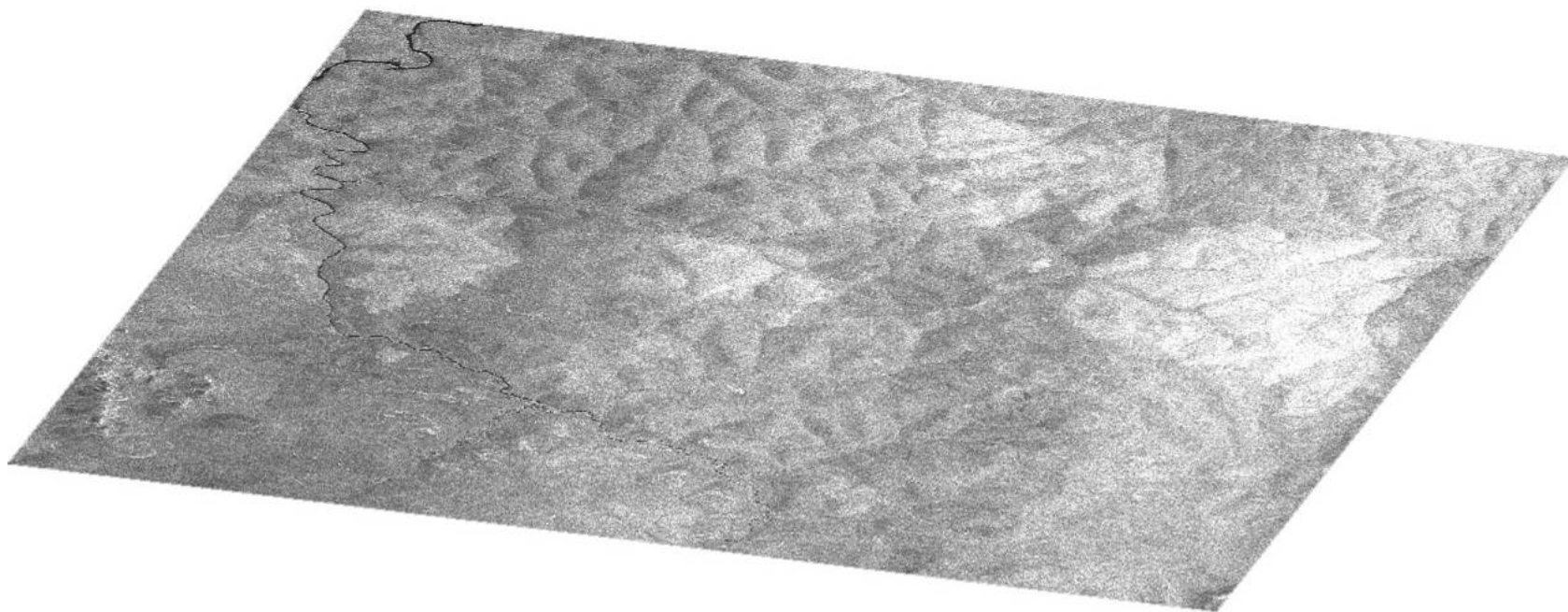
1. *2 October 2003*
2. *3 June 2004*
3. *19 May 2005*
4. *23 June 2005*
5. *06 October 2005*

2 images and (from 19 May 2005 and 23 June 2005) have been analyzed using DInSAR technique.

Also GTOPO DEM has been used.

ENVISAT ASAR Slant Range Image

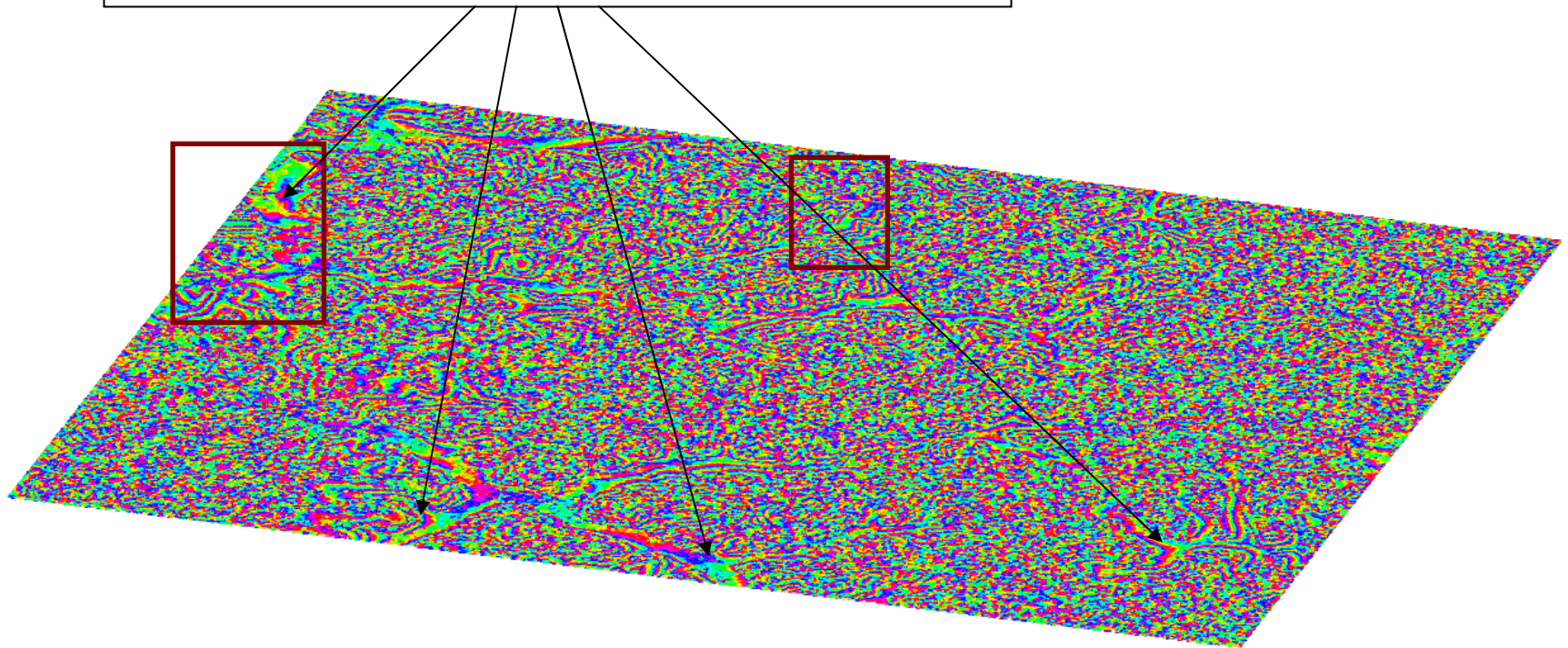
19 May 2005



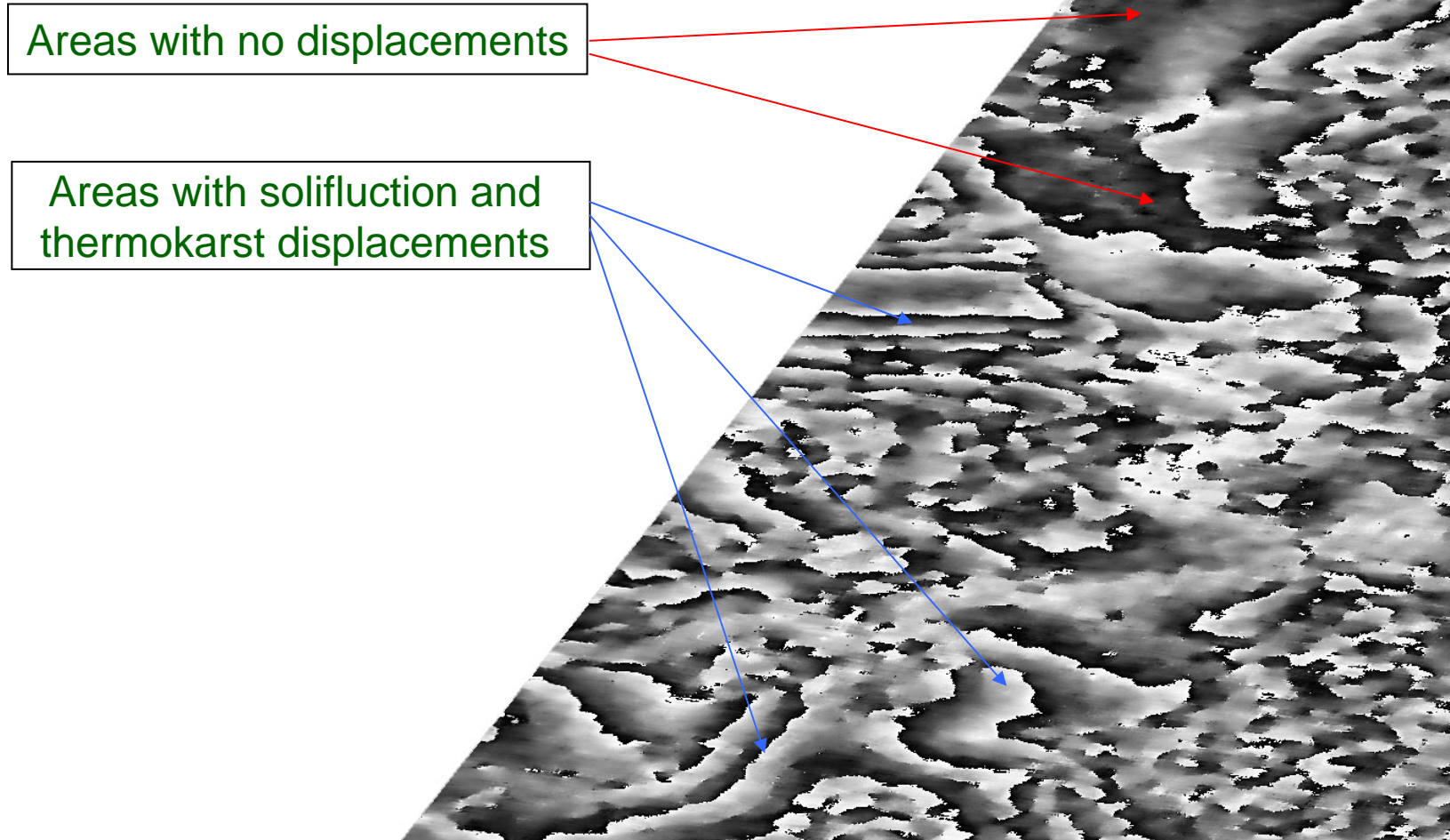
Scene center: (110:36:36 E; 66:18:00 N)

35 Days Differential Interferogram (19 May 2005/23 June 2005)

Each fringe represents 2.83 cm of range change between the ground and the satellite

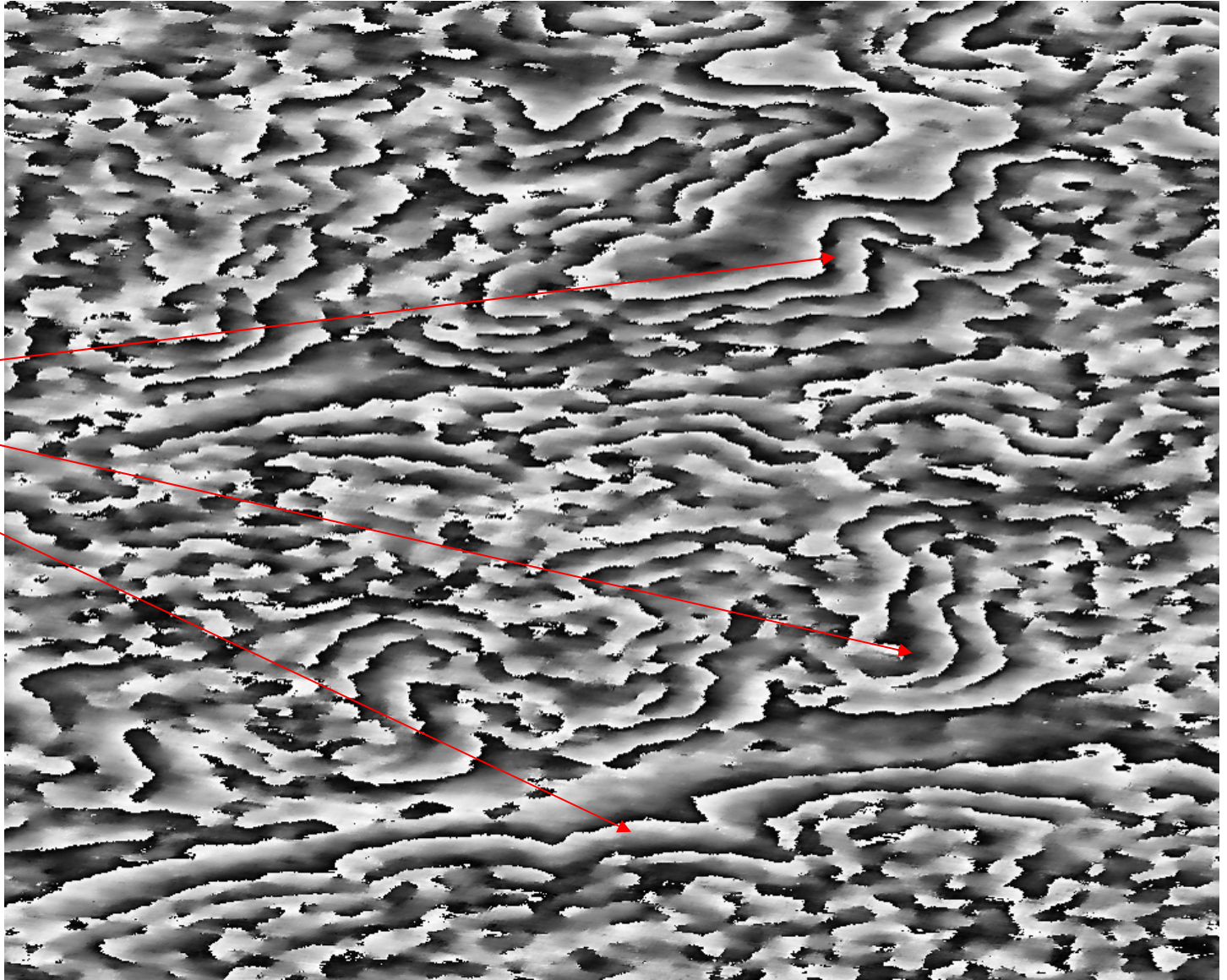


35 Days Differential Interferogram (W-part)



35 Days Differential Interferogram (N-part)

Areas with solifluction and
thermokarst displacements



Conclusion

Due to not good enough coherence between analyzed images not all image areas are investigated. However, primary results show presence of deformations (correlated with relief) about 8.5 cm of range change between the ground and the satellite.

Future work will concentrate on the detection of the deformations using 3-, 4- and 5-pass differential SAR interferometry and comparison results with GIS data (DEM, optical imagery etc.).