

# Using DIC to measure ice shelves displacement from SAR images

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## INTRODUCTION

**SAR images** are widely used in **satellite Earth Observation** due to the capability to image at nighttime and under cloud cover (e. g. tracking glaciers in polar regions). Due to the speckle phenomenon the **correlation** of SAR images is troublesome and precise **tracking** of features such as **Ice Shelves** movement can be challenging. It is then important to find efficient **DIC** (**D**igital **I**mage **C**orrelation) algorithms for those images.

## METHOD

### DATA

**LARSEN C images** from the Scientific Open Hub of the ESA (Sentinel-1). The images are taken at **12 days delay** and cover a period from **2014 to the 2017 crack**

### SOFTWARE

After image preprocessing 'DaVis LAVISION' is used for the implementation of **DIC algorithm LSM** (**L**east **S**quare **M**ethods) used in material **strain-stress analysis**.

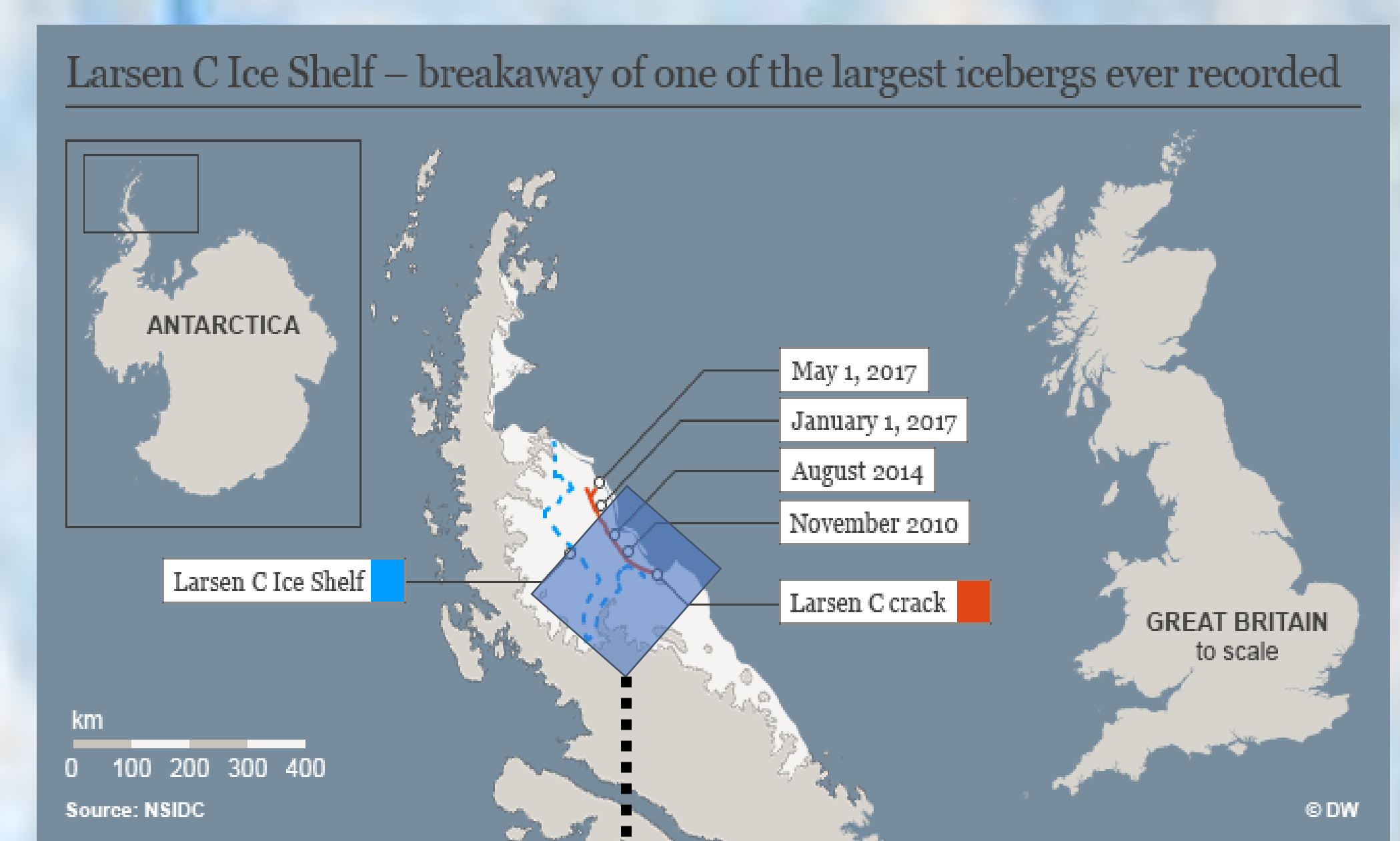


Figure 1. Larsen C disruptment history.

## RESULTS

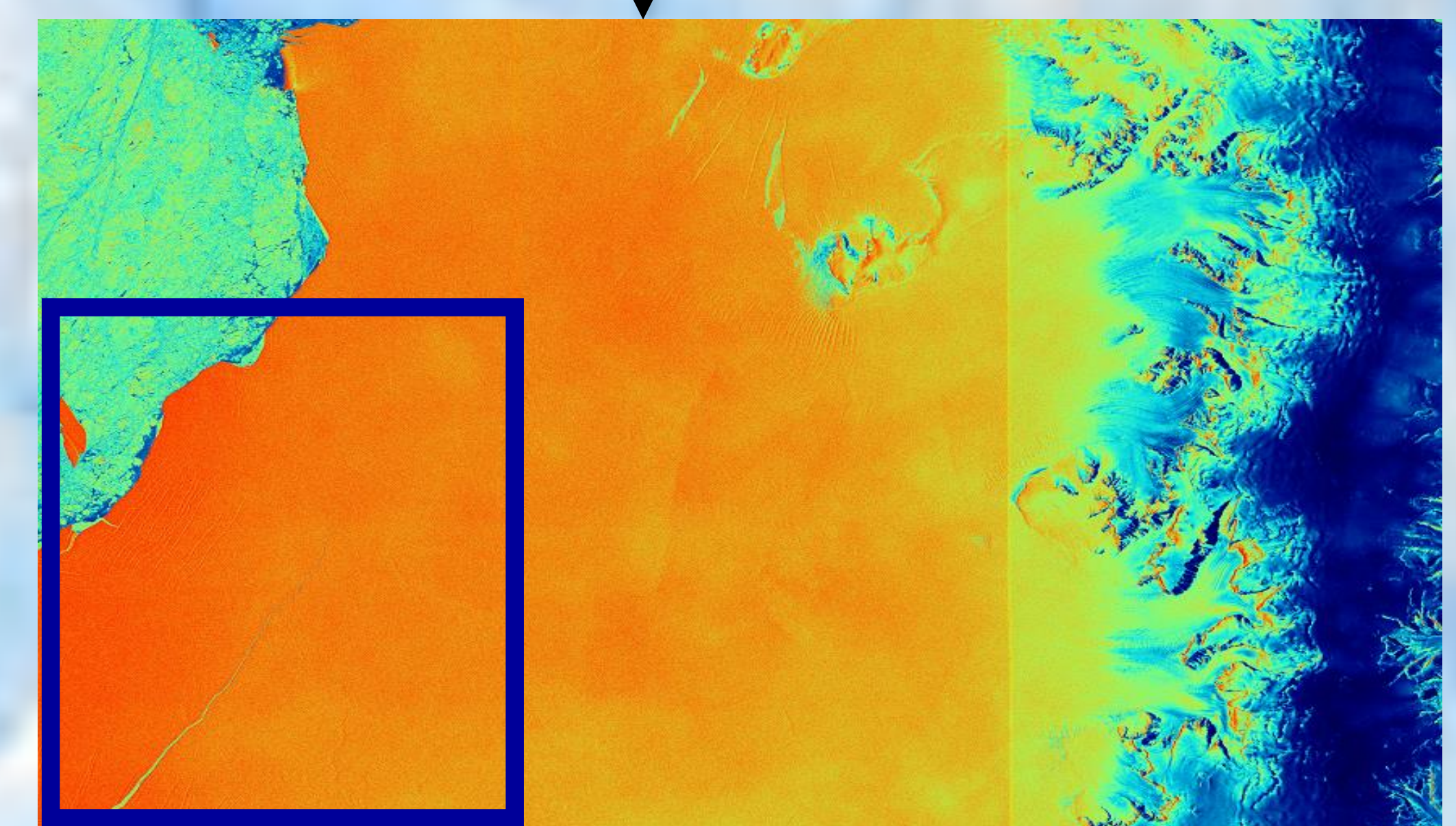
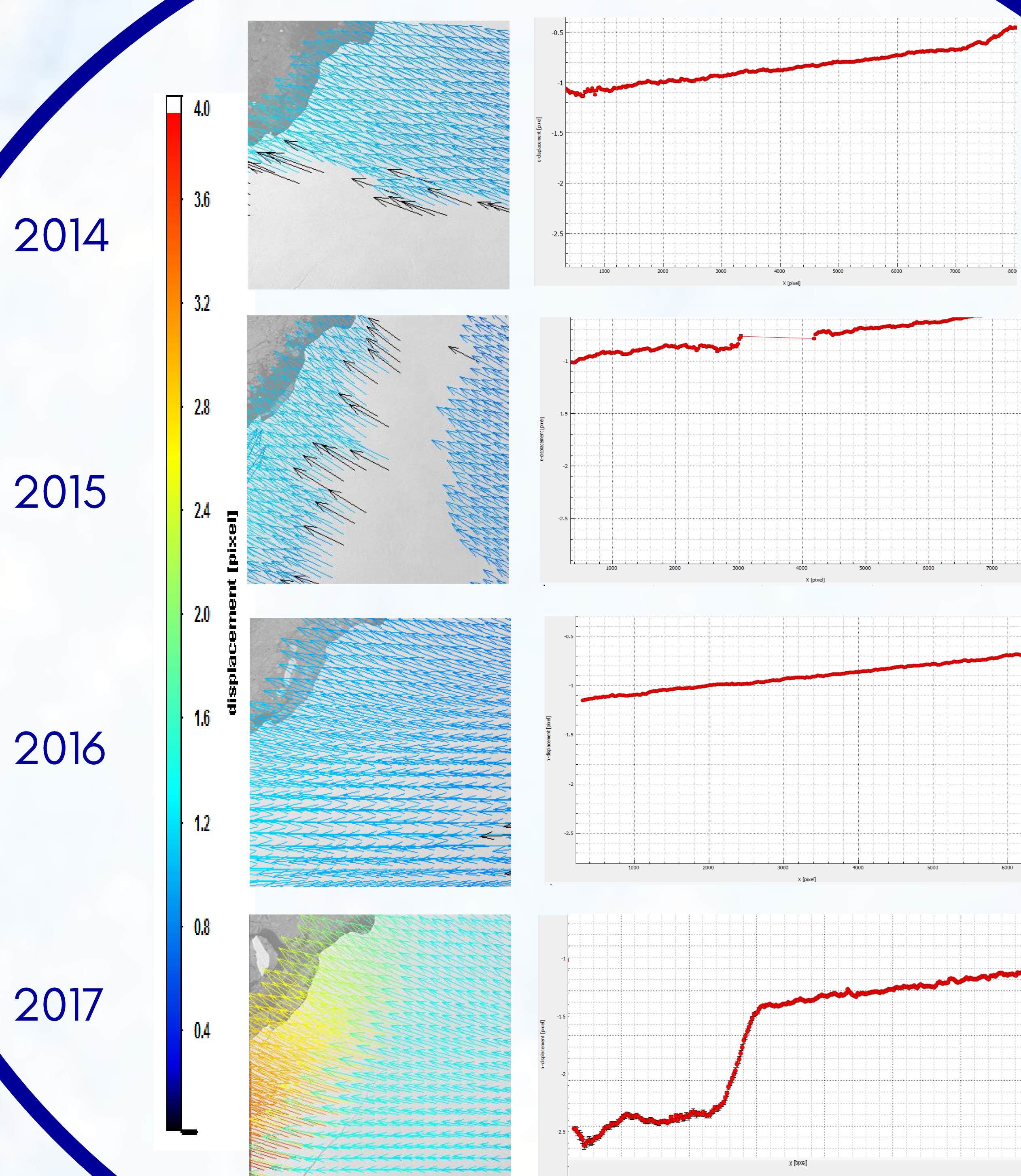


Figure 2. Sentinel-1 image of July 2017 of the Larsen C Area. In the box, the crack area that has been analyzed.



In the four images we can see the evolution of the  $V_x$  displacement

- 1 pixel = 20m
- Displacement in 12 days

## CONCLUSIONS

Trough correlation calculation, we can estimate the **progressive acceleration** of the **Larsen C** Ice Shelf until 2017 crack that is coherent with the results found in literature. **In the future** we would like to use the **strain-stress analysis** algorithm for other Earth Observation tasks that involve use of SAR images

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