

# Light Curve of a natural outburst of comet Tempel 1

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# Light Curve of a natural outburst of comet Tempel 1

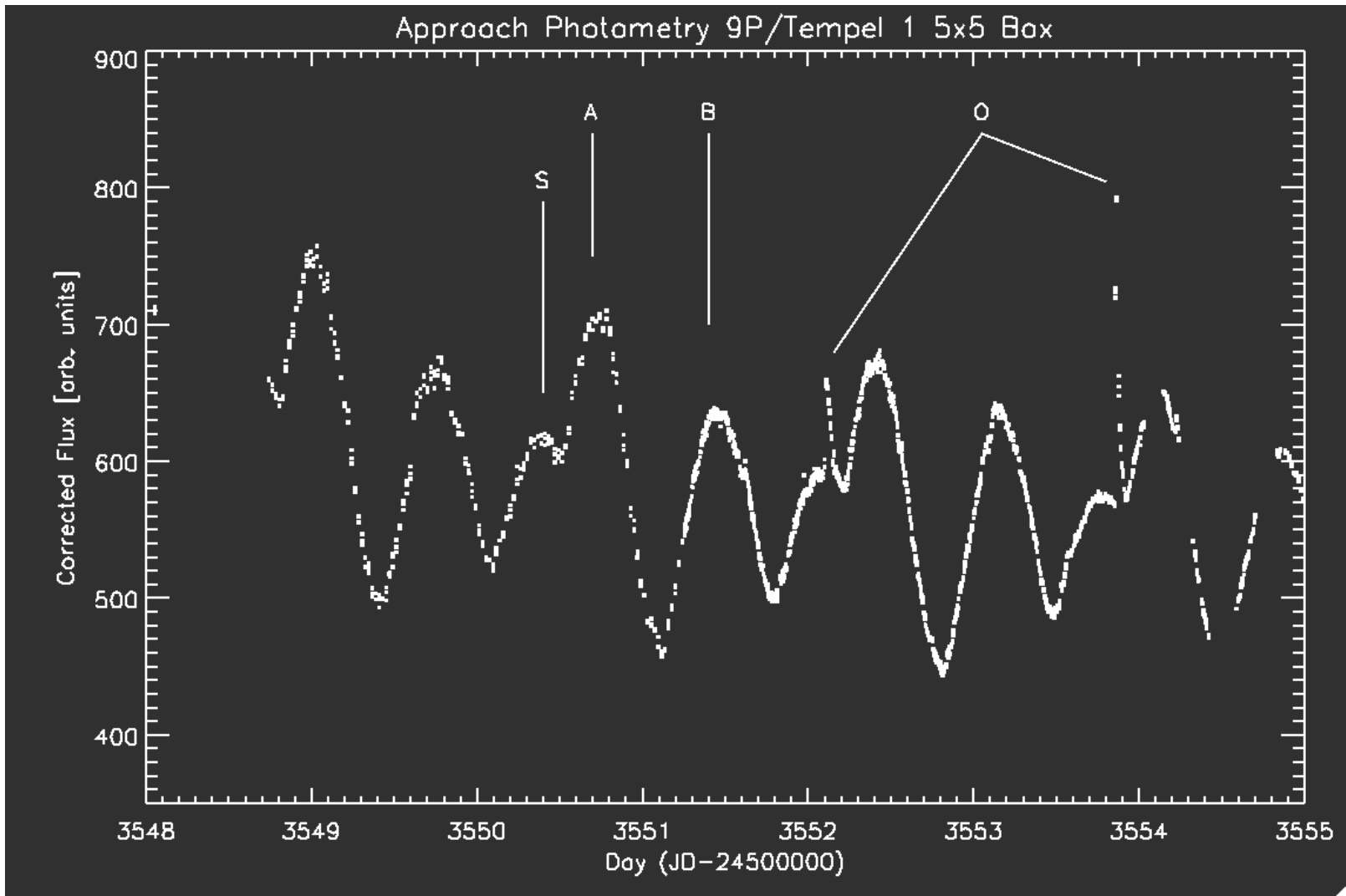
(at least an attempt of !)

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## **Objectives of this work were:**

- Determine how long the emission of material continues, which is important in choosing a mechanism for producing the outburst.
- Determine whether the outflow of material explains the drop in brightness after the outburst.



Credit: A'Hearn's plot

## Applied method

- 1) Selection of images that include the outburst (plus some others before and after the outburst).

Images from MRI: scientific data and navigation data  
(MRI – Medium Resolution Images)

- 2) Data Processing: photometry done with PHOT in IRAF using 5 different circular apertures (5, 9, 15, 25, 40).
- 3) Plotting the correspondent light curve with Excel.

## Problems

1) Dates of outbursts were wrong

“July 1” actually corresponded to June 30, 2005

“July 3” actually corresponded to July 2, 2005

2) Had to open all labels in order to find out the proper required images (corresponding to the right time interval and clear filter)

3) For the same right time interval and clear filter there are images taken with different exposure times ( 0.8 s and 8.0 s)

4) Each calibrated science image has three “extensions”:

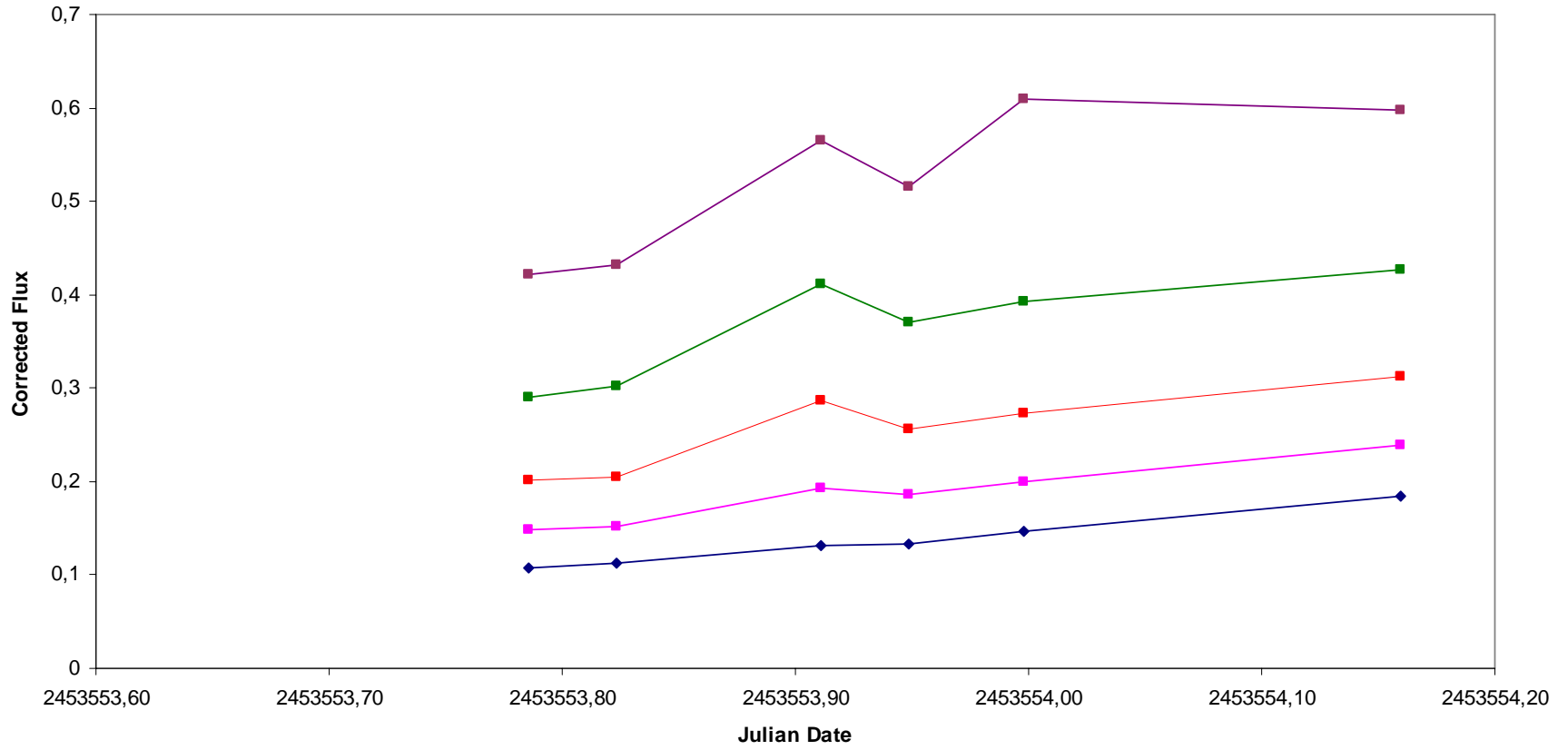
[0] image data

[1] image quality

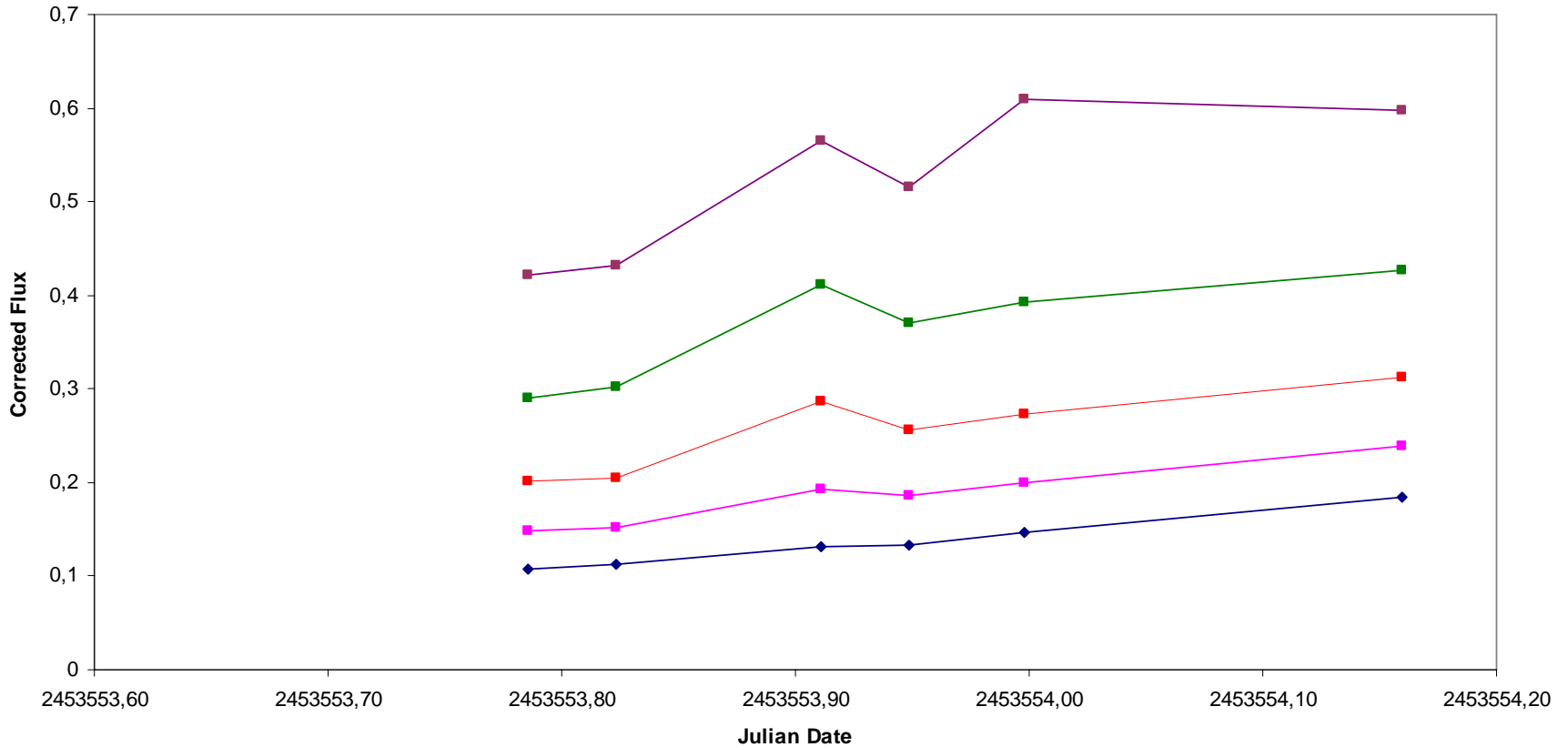
[2] signal to noise ratio

5) Only seven scientific images were found (and even one of them was corrupted)

Light Curve July 2, 2005  
Science Data



Light Curve July 2, 2005  
Science Data

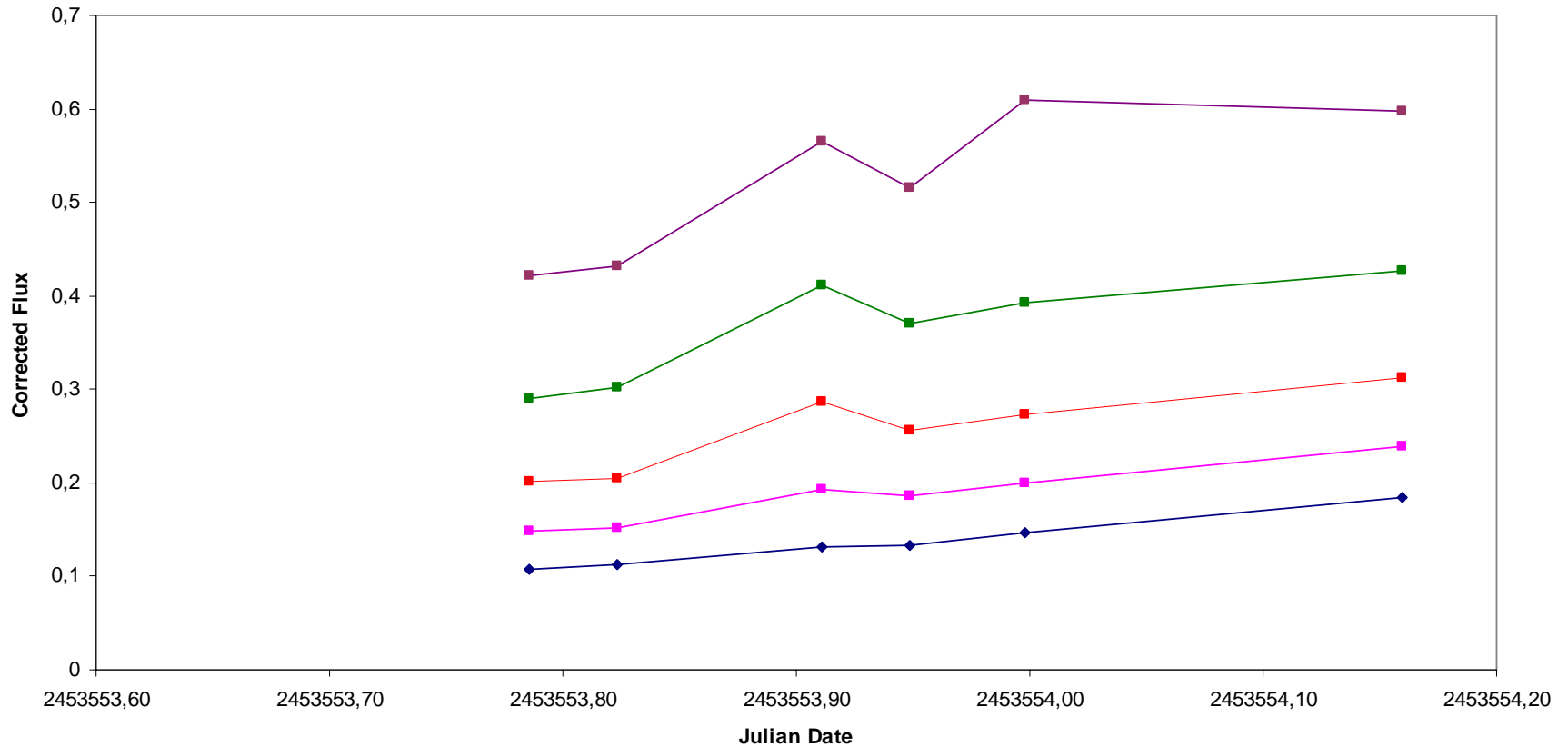


Outburst is barely visible due to having used images of exposure time 0.8 s

(small S/N). We should have used images of 8.0 s !



Light Curve July 2, 2005  
Science Data

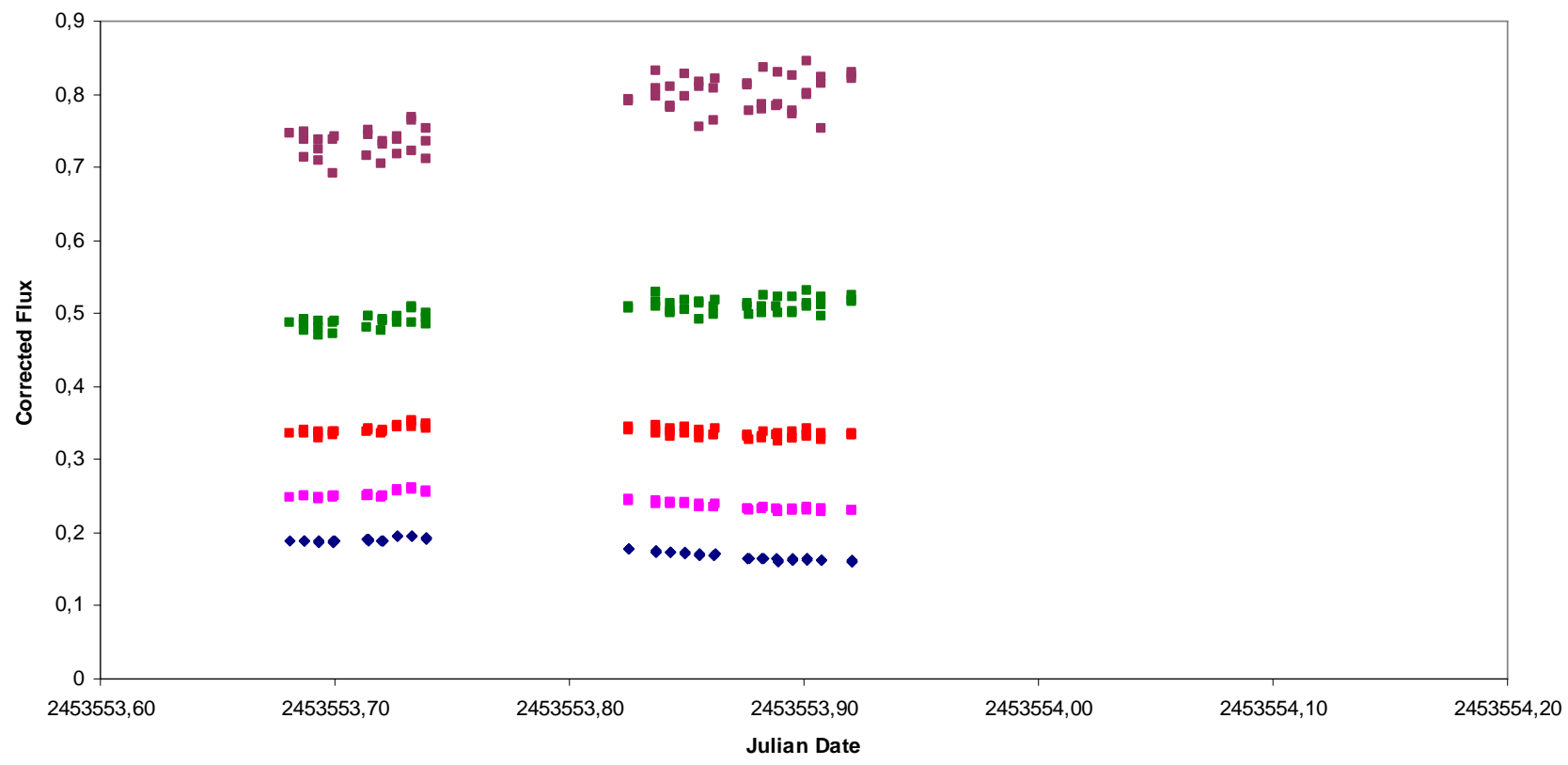


Our preliminary result is that the July 2, 2005 outburst of comet Tempel 1 took place during about 3 hs.

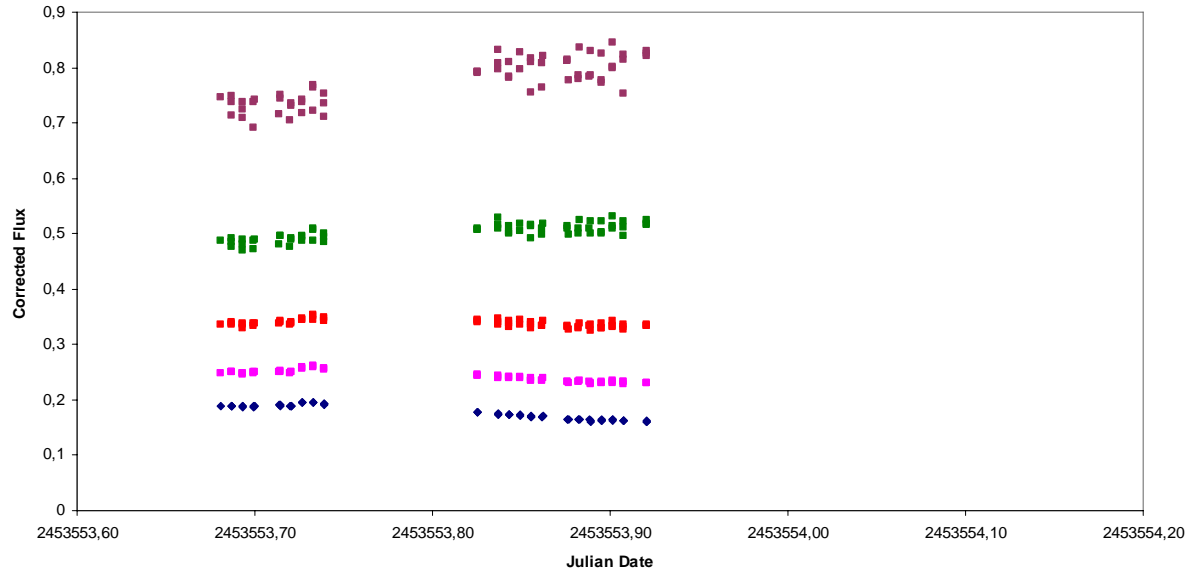
In order to improve the quality of the outcome it's necessary to include more data points to our light curve.

Suggestion was to eventually obtain those points from the navigation images.

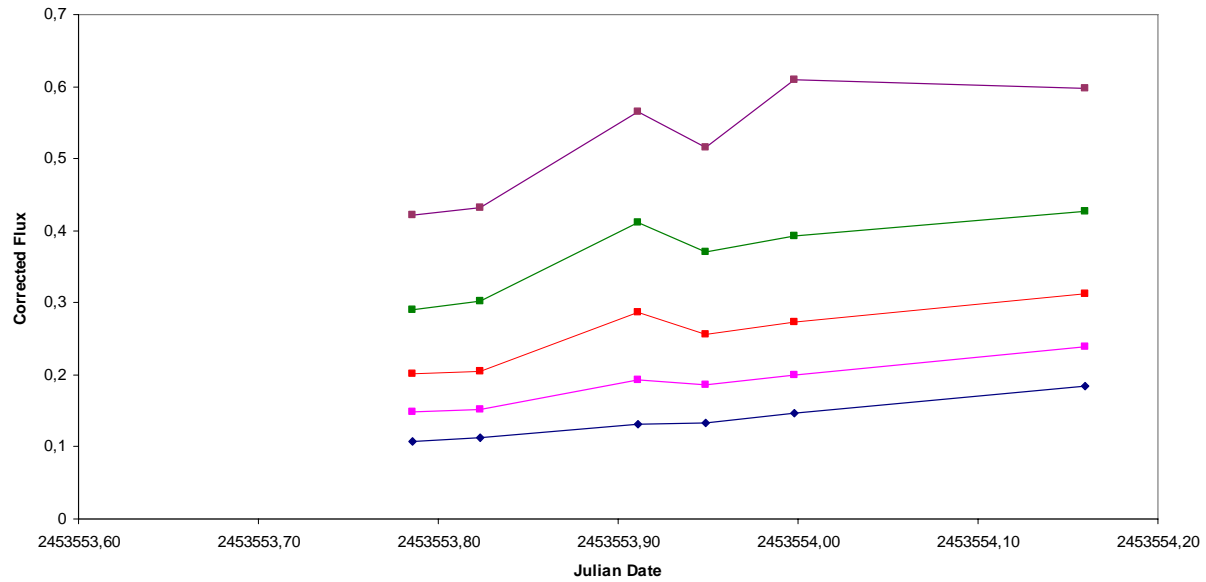
### Light Curve July 2, 2005 Navigation Data



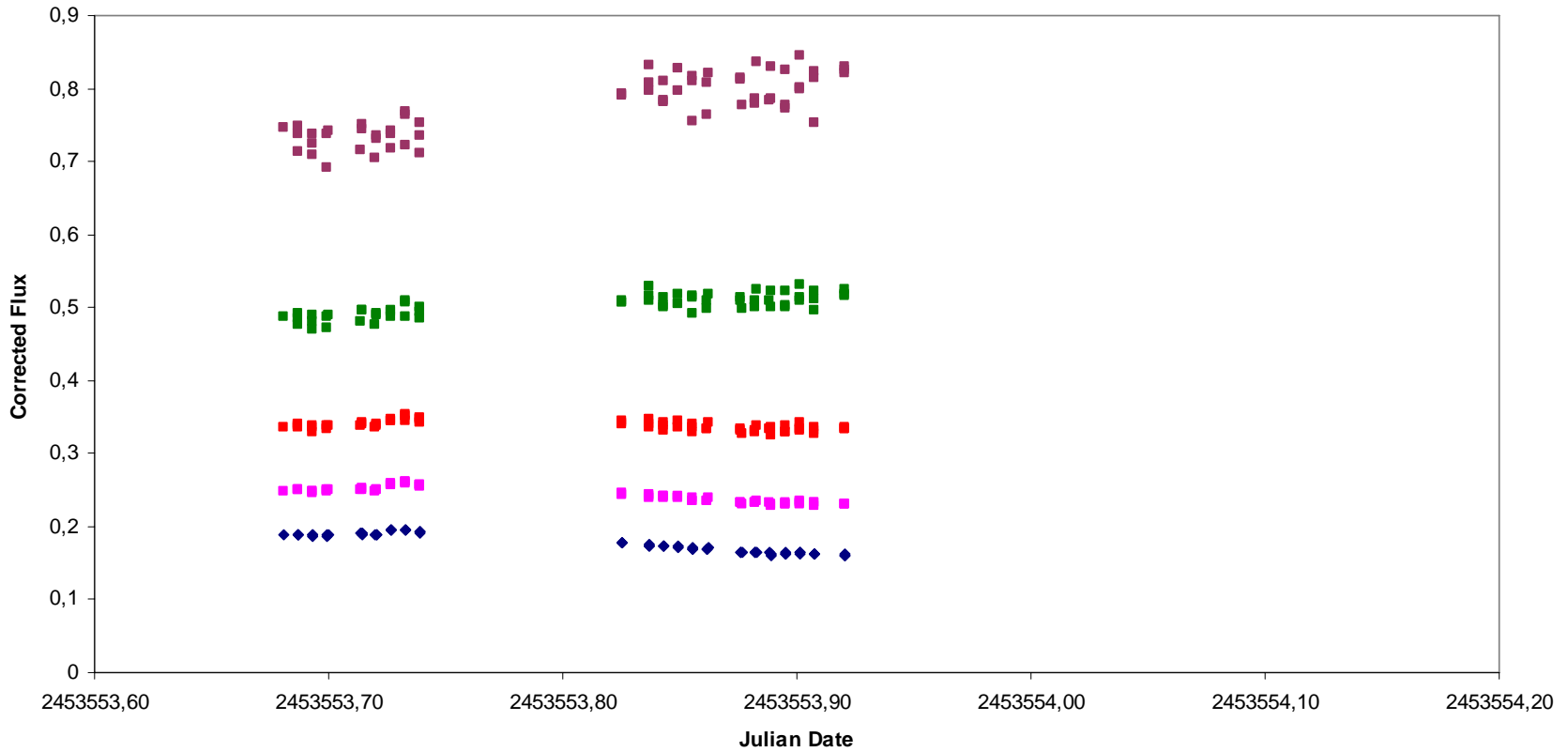
Light Curve July 2, 2005  
Navigation Data



Light Curve July 2, 2005  
Science Data



Light Curve July 2, 2005  
Navigation Data



At August 3, 2007, 13 hs (local time) we were informed that the Julian Date of the Navigation images are wrong due to a 0.5 day shift !!

## Conclusions

We found only very few images for deriving a proper light curve as required.

Surprisingly, we found errors in image headers.

The process of selecting the right images to work with demanded us a much larger time investment compared to the analysis of the corresponding data.

In order to improve the precision of our preliminary result (outburst of July 2, 2005, equal to 3 hours), it is necessary to work with much more data.

**Questions?**

## Questions?

(Be mercy, please)