

Ancient Monuments Laboratory

Gallows Hill, Thetford: Notes on Computer Plots of Phosphate and Magnetic Susceptibility Survey Data

Report no. G33/85

Introduction

The plots enclosed are based on the results of phosphate and magnetic susceptibility surveys carried out by the Norfolk Archaeological Unit in 1983. The survey readings were forwarded by Mr Gregory of NAU to the AM Laboratory for processing, and this was done using the Data General Nova 4 minicomputer at the Physics Department, University of Surrey. Identical treatments were applied to the two sets of data:

Processing

In the initial surveys two blocks of ground were covered with readings taken on a 5m grid, but areas to the N and W of the site were only surveyed on a 25m grid. To allow the results from the complete site to be uniformly displayed and interpreted it was necessary first to interpolate the 25m surveys on to a 5m grid. The 1:2500 scale graphical plots (ii) show the otherwise untreated data after this was done.

Contours of these results would appear excessively fragmented, and so in an attempt to clarify the picture a second interpolation was carried out. This filled the gaps between the sections of the survey and filled in missing readings. A further difficulty is that the 5m readings appear very much noisier than the coarser data, and would produce a very confusing pattern of contours. A survey at this resolution will detect primarily broad trends in the response from the site, and so to emphasise these and reduce the noise a simple smoothing routine (in which the mean of 8 nearest neighbours is added to each reading) was applied to the data. The output was divided by two to restore the initial data units. The plots (iii) show the results of the second interpolation followed by smoothing. Linear interpolation between neighbouring readings was used at each stage of processing.

### Plotting

Two final displays of these surveys were attempted. The dot-density plots (iv) show values above the mean of the data (positive anomalies) only. The contour plots (i) are reproduced at 1:1000 scale to match the site plan supplied by NAU, and show the full range of the data. Contours below the mean are marked by ticks.

### Interpretation

At risk of trespassing in the province of those who carried out the surveys and will be able to interpret them in the light of excavation findings I should like to offer a few remarks.

In both surveys there is a tendency for high readings to occur towards the W or SW of the site, but this effect occurs mostly within the 25m survey where individual readings have a heavy influence on the final plot and should perhaps not be uncritically relied upon. It might however be significant that some of the few magnetic anomalies detected in the rather unproductive AM Laboratory magnetic survey of this site (AM1 report G23/80) were in the SW corner of the field where both phosphate and susceptibility readings are high.

There do not appear to be conspicuous concentrations of either phosphate or high susceptibility values within the major triple ditched defended enclosure which has been excavated towards the SE of the site, but detailed comparison with an excavation plan might produce some (negative or positive) correlation.

Within the areas covered by the more detailed 5m surveys the maxima in the phosphate data appear largely to be made up of perhaps randomly distributed single readings. The susceptibility readings show some small-scale noise of this kind, but there are also relatively broad areas of enhanced

readings as can be seen for example in the dot-density plot. Whether these variations could be archaeologically significant is not clear from the survey data alone.

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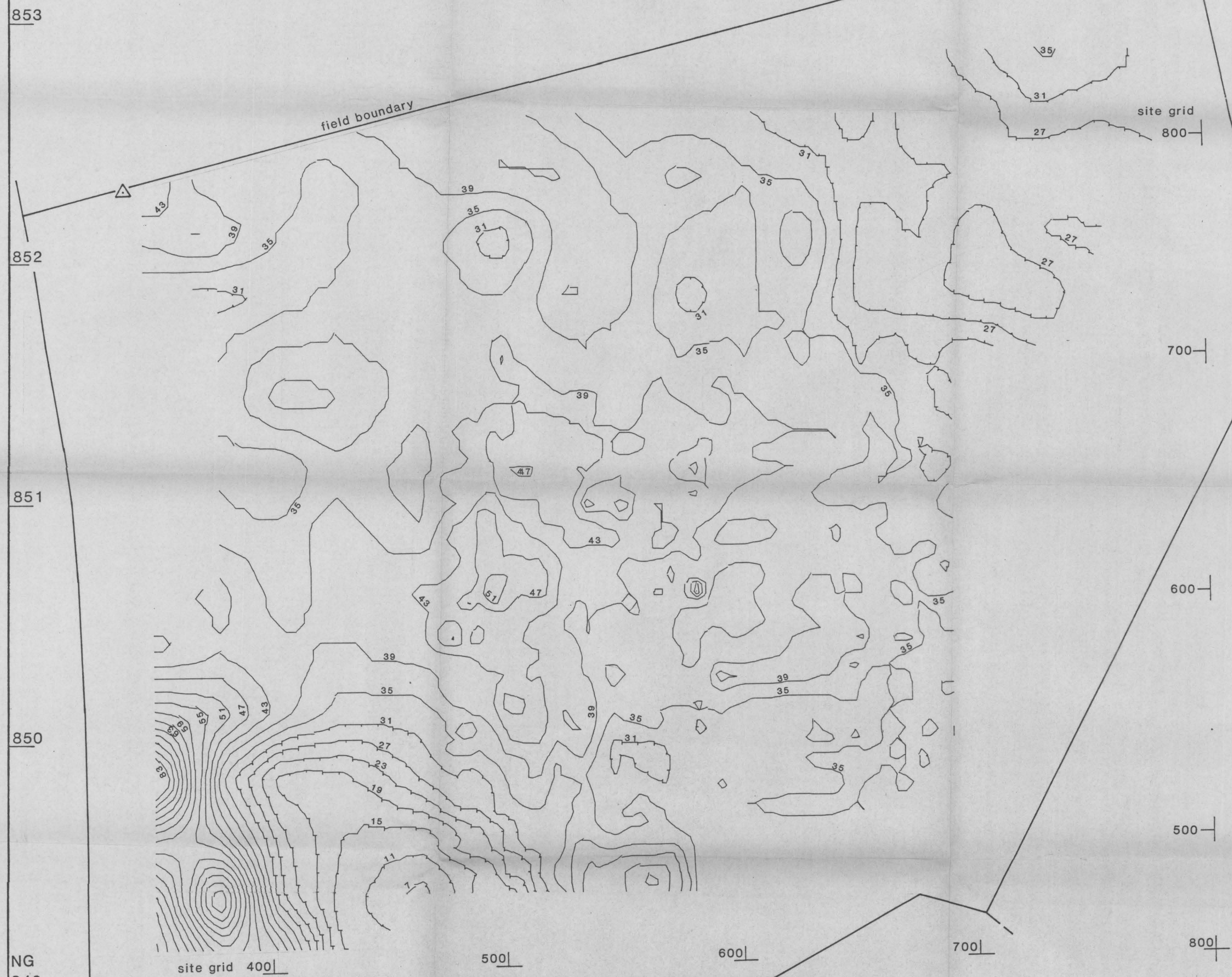
London W1X 2HE

01-734 6010 Ext 527.



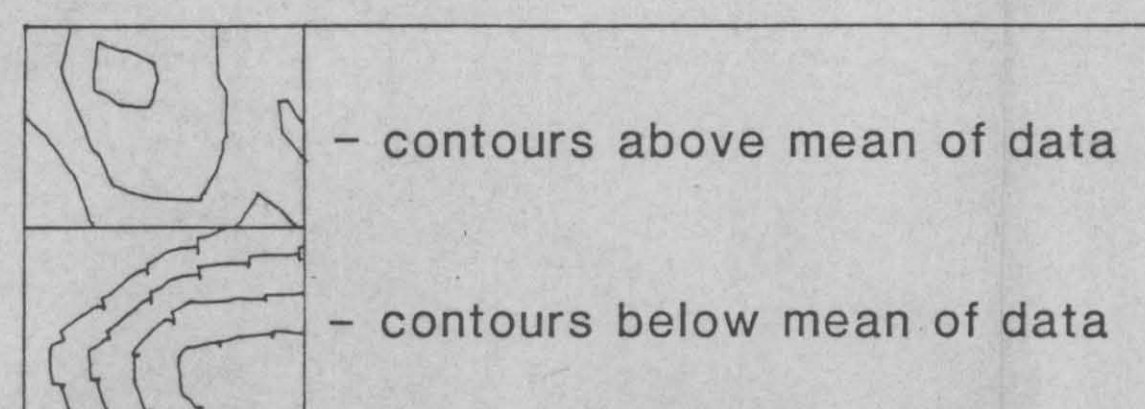
# GALLOWS HILL, THETFORD

Magnetic susceptibility survey

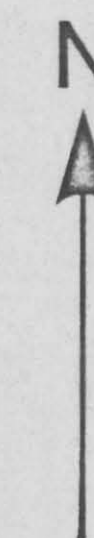


## i) Contour plot , 1 : 1000

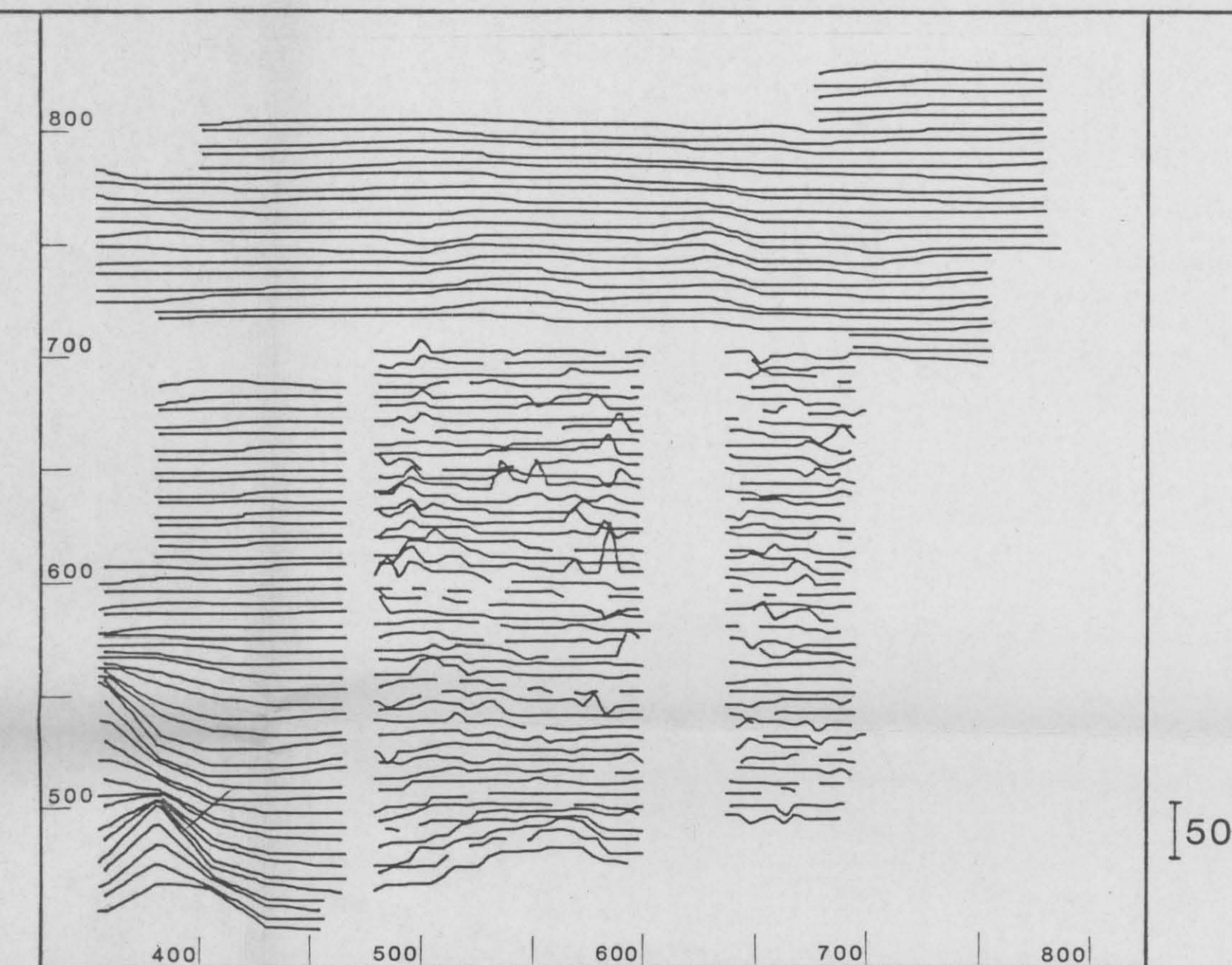
smoothed data  
range : minimum - maximum  
contour interval : 0.5 standard deviations  
(ie 7 - 86, interval : 4)



plots ii) - iv) at 1 : 2500

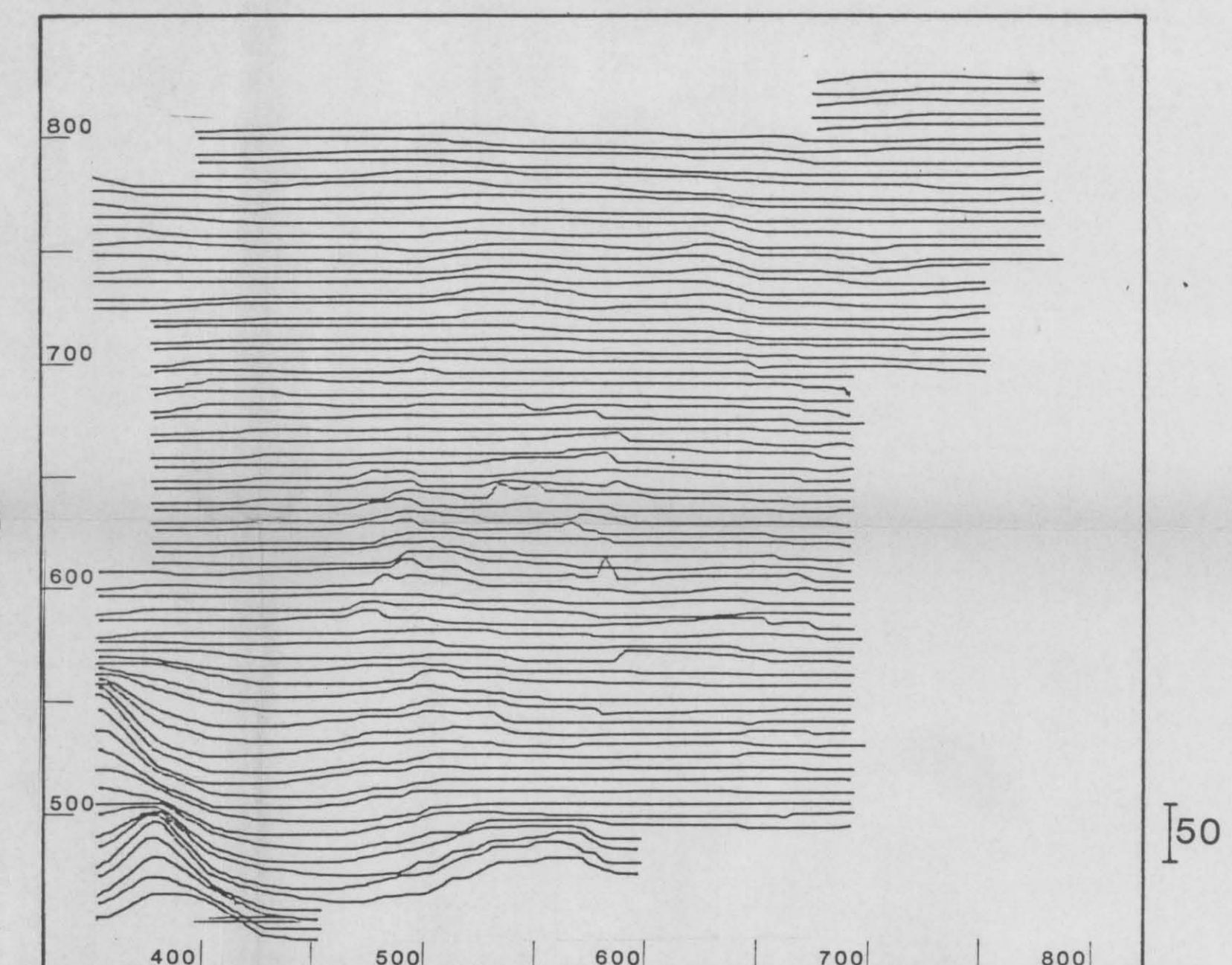


ii)



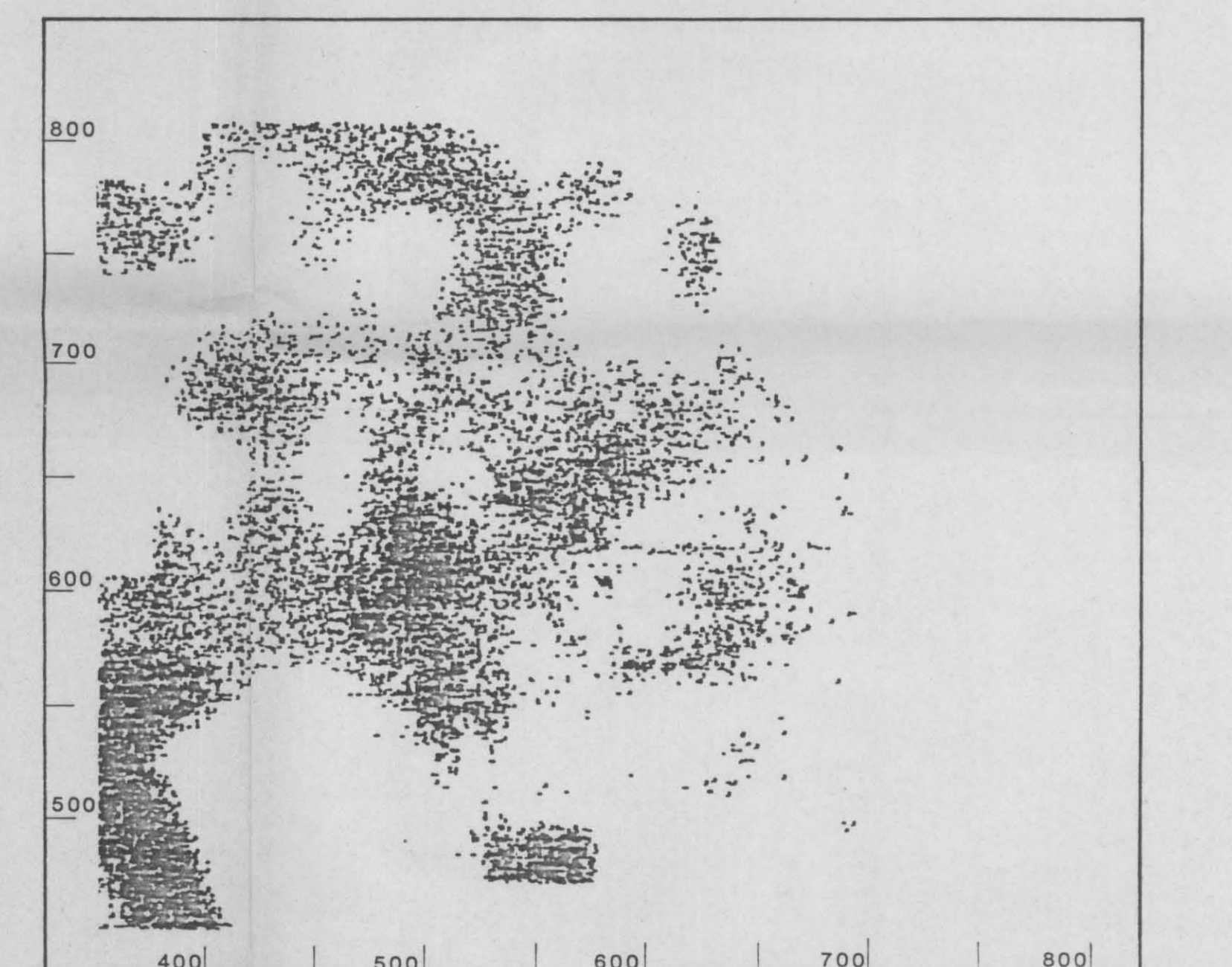
Initial data : 25 m survey interpolated to 5 m grid  
max. 96 min. 5 mean 35 standard dev. 8.5

iii)



Smoothed data : missing readings interpolated  
max. 90 min. 5.5 mean 35 standard dev. 8.1

iv)



Dot-density plot : smoothed data  
positive anomalies  
mean to mean + 2 st. devs. in 16 levels



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Phosphate survey

853

852

851

850

NG  
849

NG 865

866

867

868

N

ii)

Initial data : 25 m survey interpolated to 5 m grid  
max. 320 min. 0 mean 94 standard dev. 37

iii)

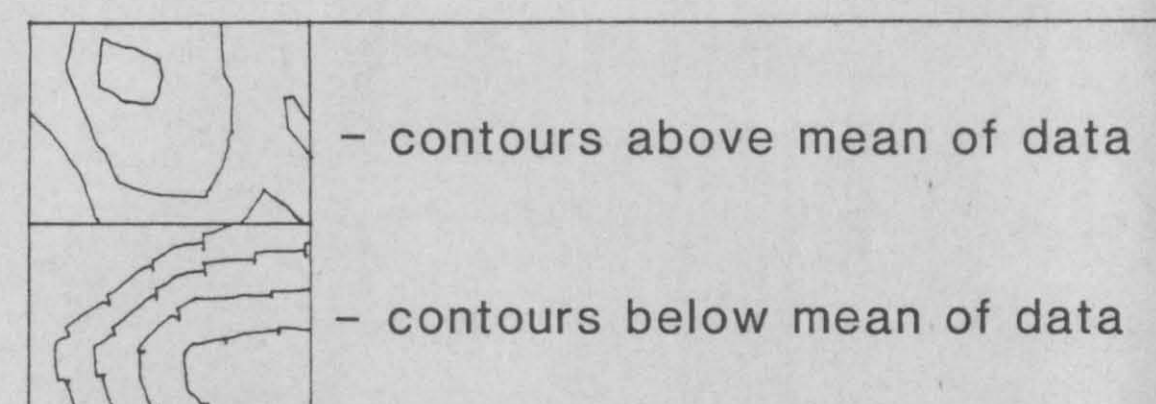
Smoothed data : missing readings interpolated  
max. 253 min. 21.5 mean 94 standard dev. 35

iv)

Dot-density plot : smoothed data  
positive anomalies  
mean to mean + 2 st. devs. in 16 levels

i) Contour plot , 1 : 1000

smoothed data  
range : minimum - maximum  
contour interval : 0.5 standard deviations  
(ie 25 - 252.5, interval : 17.5)



plots ii) - iv) at 1 : 2500