

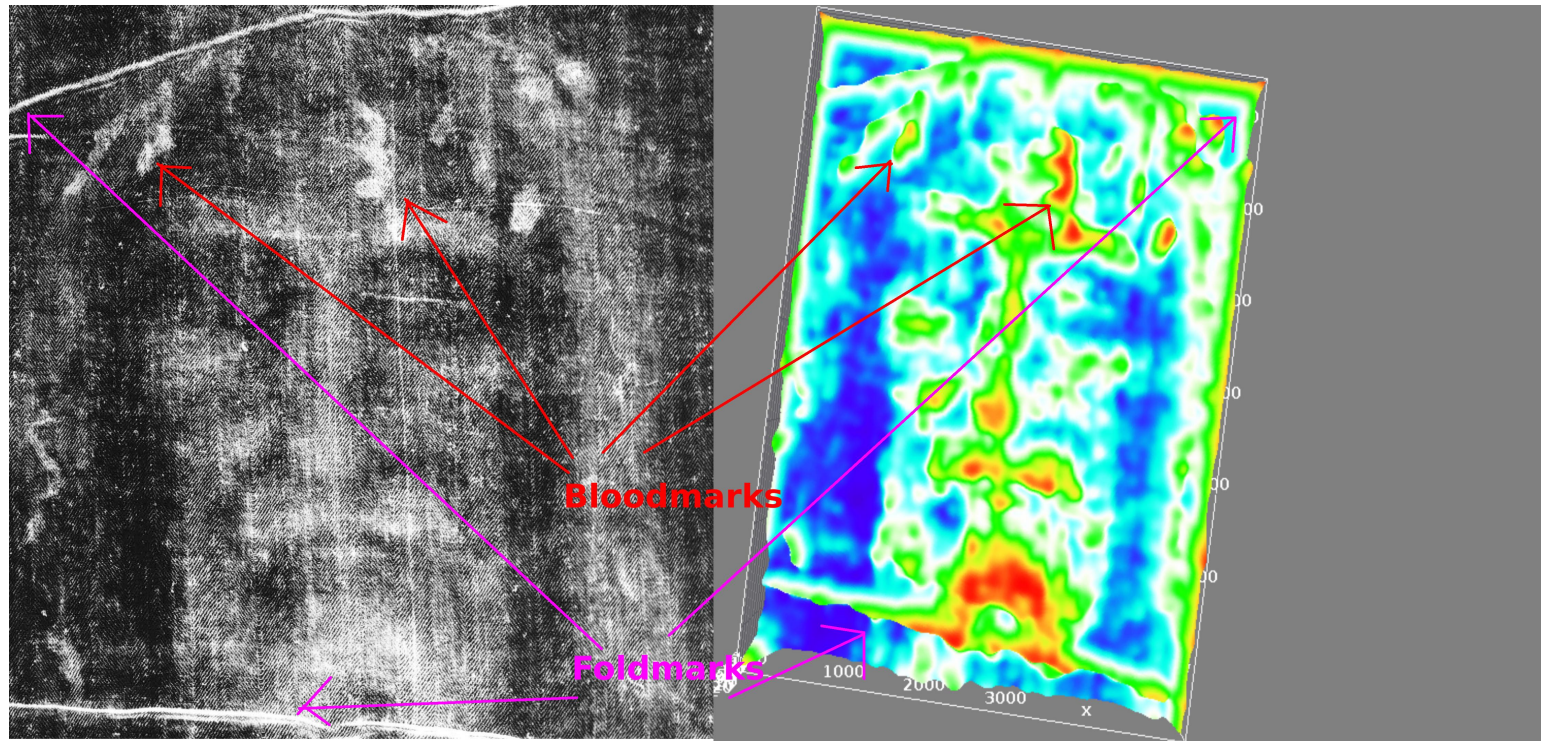
3D properties of the Shroud revised

Version 1.0

By O.K.

Part 4

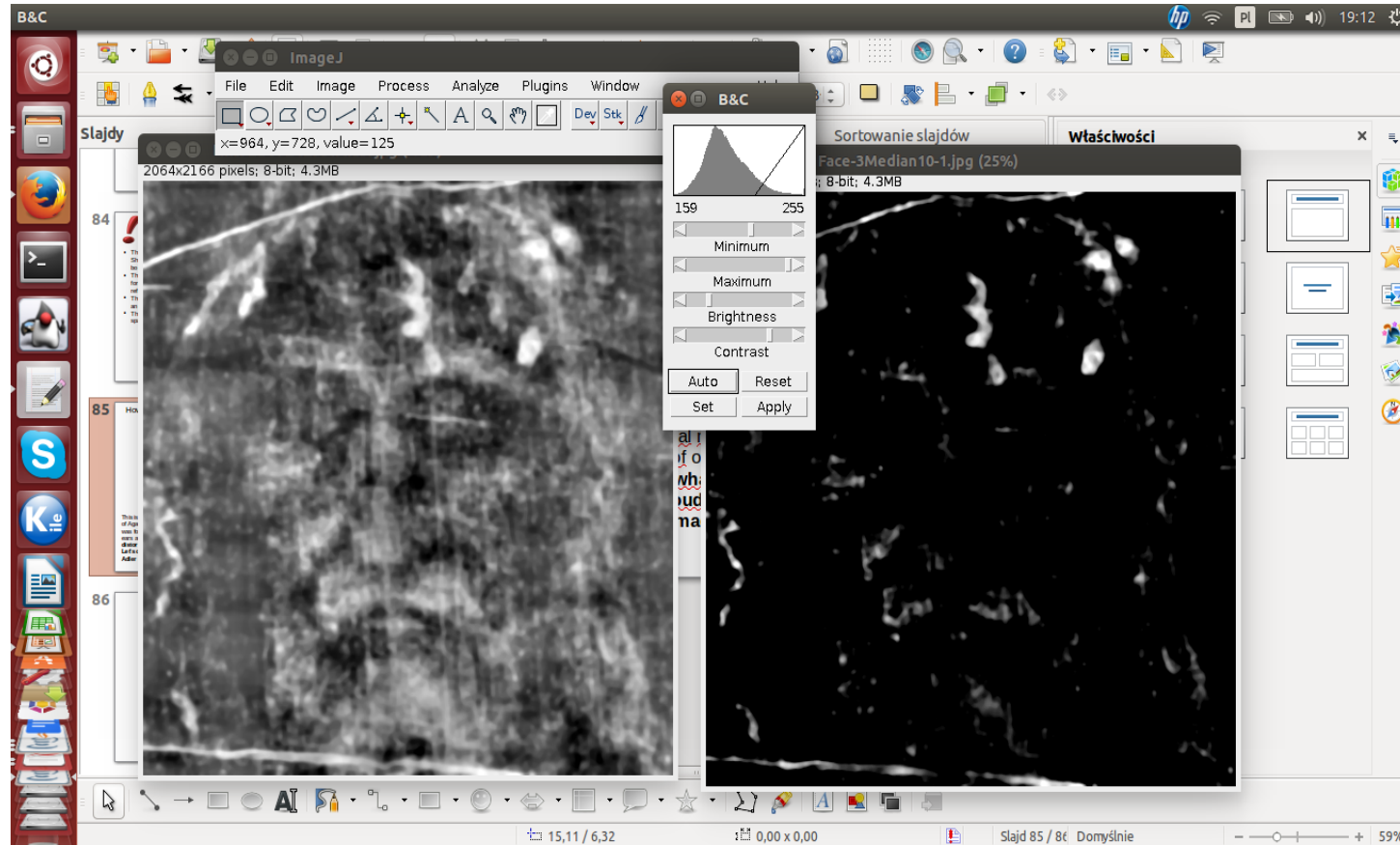
How to get rid of bloodmarks, folds etc. using only monochromatic pictures.



The bloodstains, foldmarks and other contamination in the background obviously distort the image. We want to get rid of them to obtain more accurate 3D representation of the Shroud.

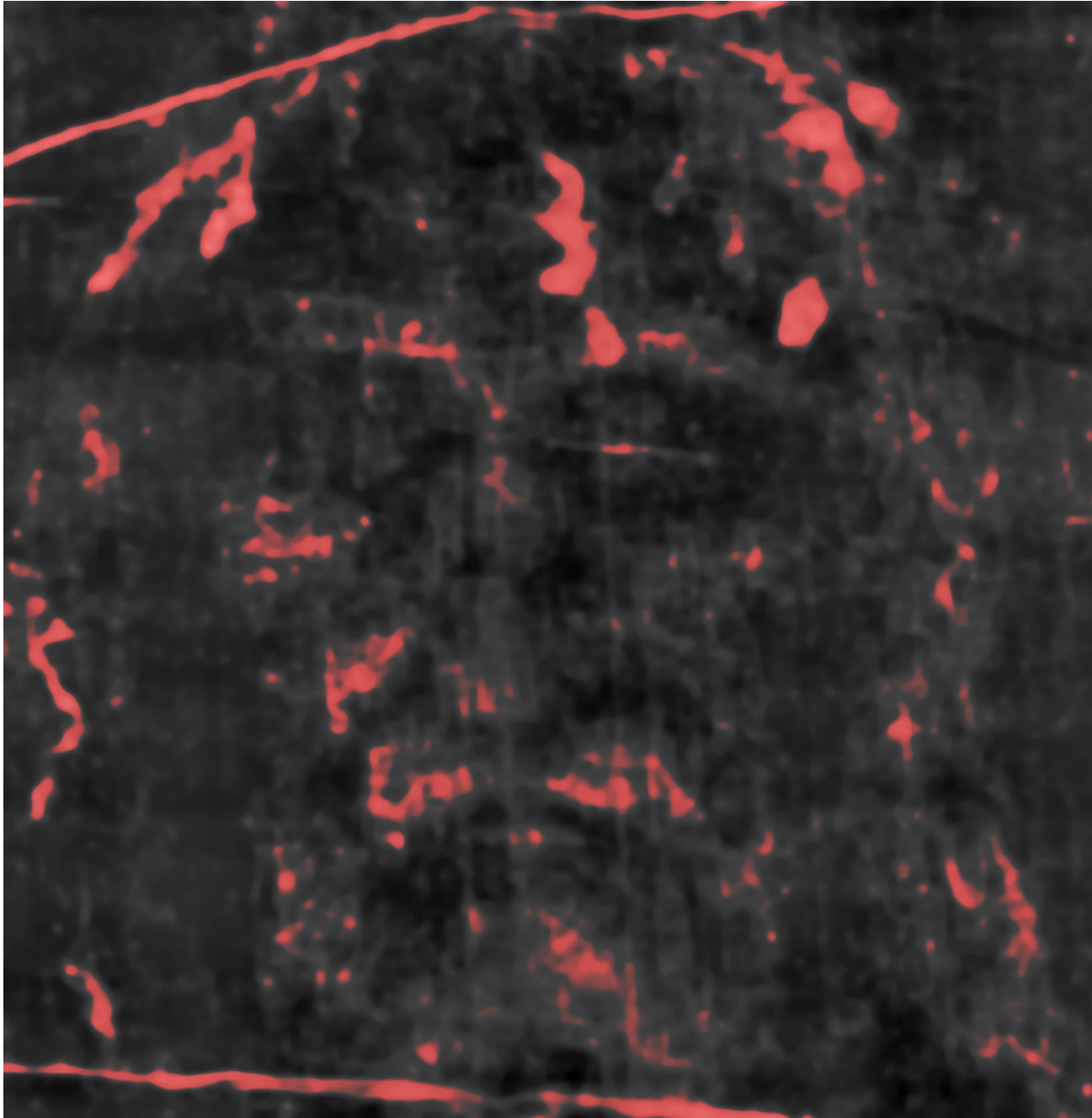
The normal way to do so, is to use several images obtained at different color channels: doing so you can separate bloodmarks burnmarks etc. from the body image. But this can be also done with B&W images, although in a very crude way.

We begin with two assumptions: 1.) that bloodmarks, foldmarks etc. are more intense on negative images than body image 2.) Bloodmarks are result of the contact process. This means that areas directly adjacent to them should be in contact with the Shroud (thus the most intense)



This allows us to establish approximately max intensity of body image, and separate everything above that value as contamination. And later subtract it from the negative image. Of course, with some basic maths in mind, in this example we have to multiply „blood” mask intensity by $(256-160)/256=0.375$, before we subtract it from the main image.

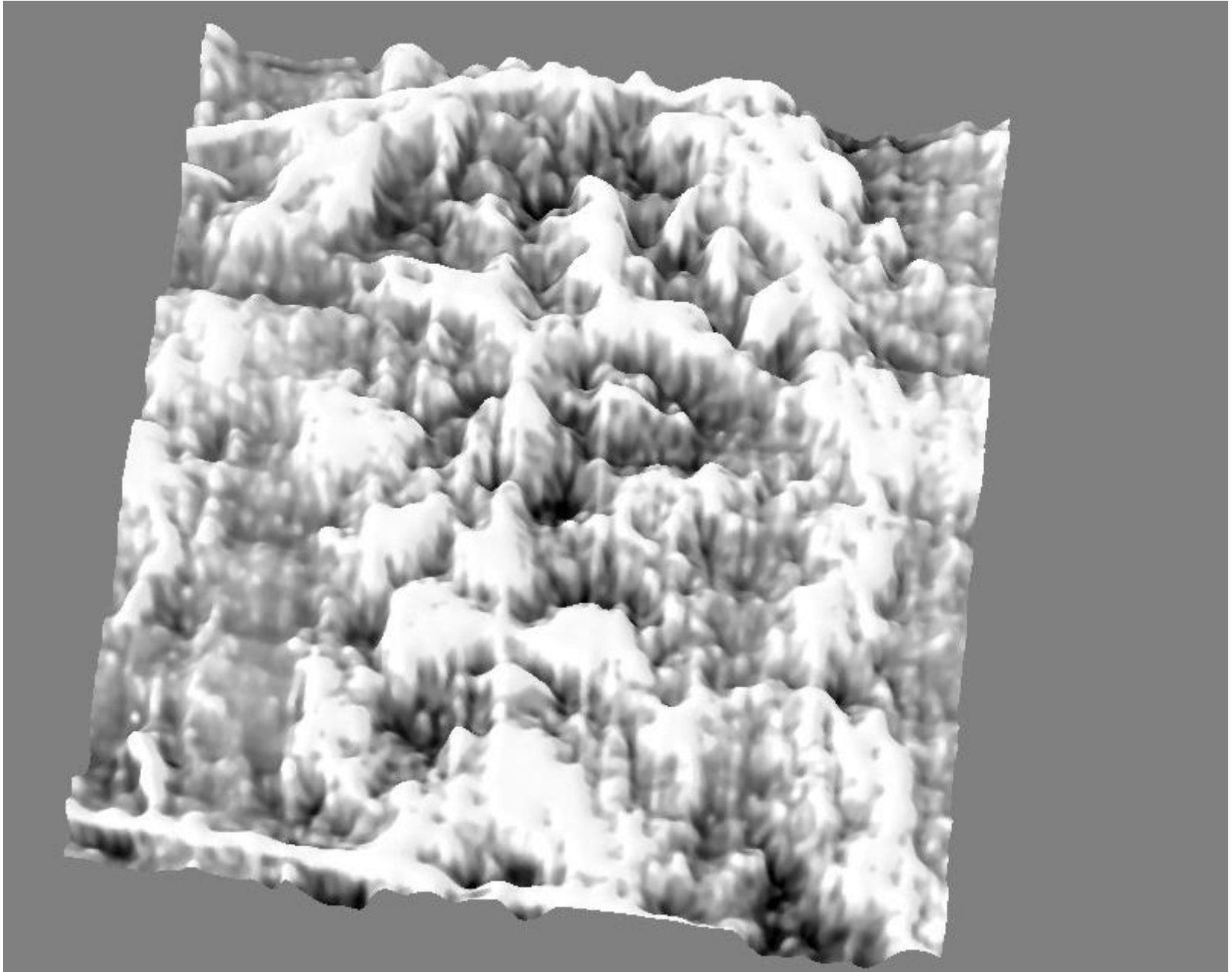
The Shroud face with „bloodmarks” on it.



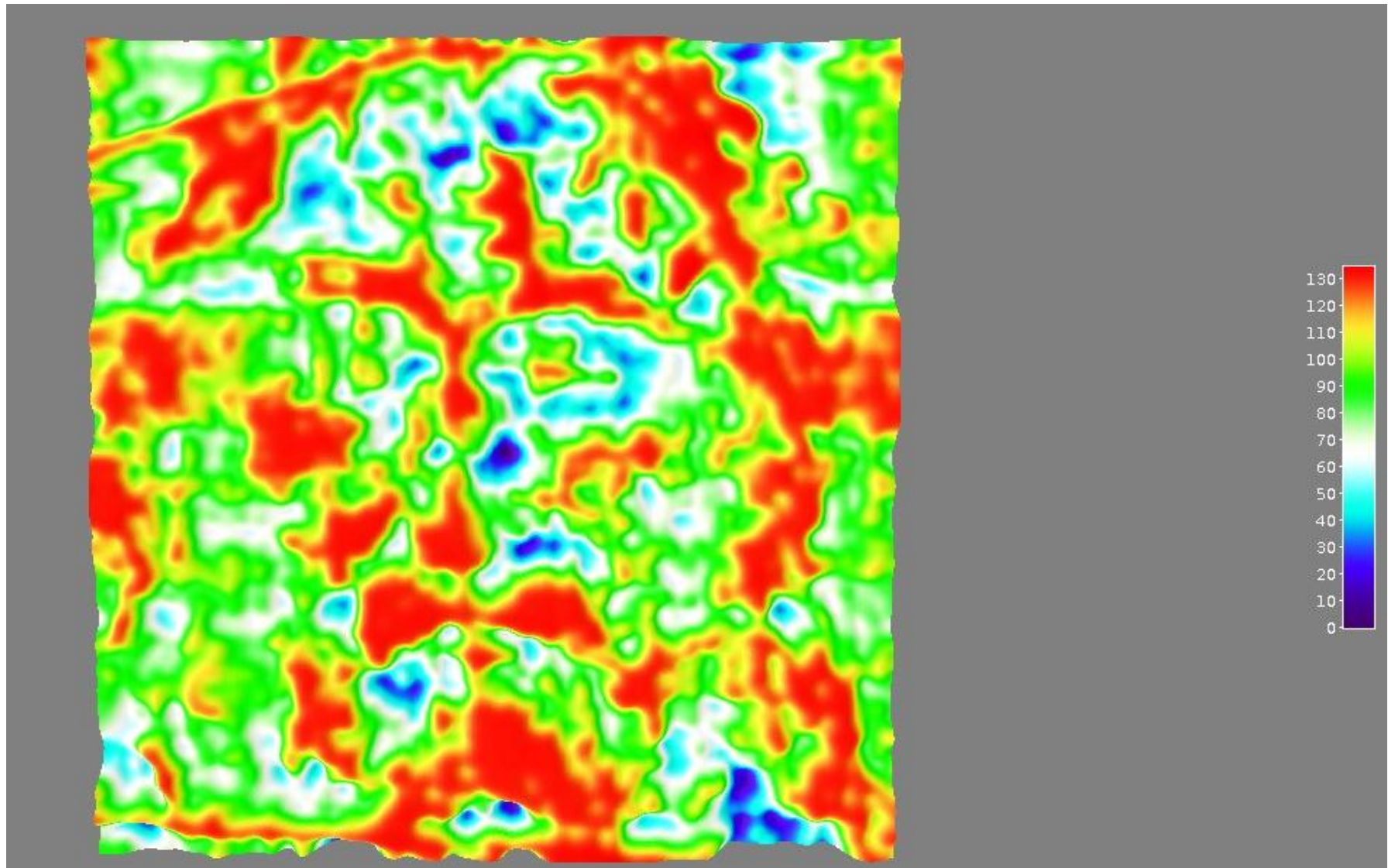
The effect of subtraction



Here in 3D

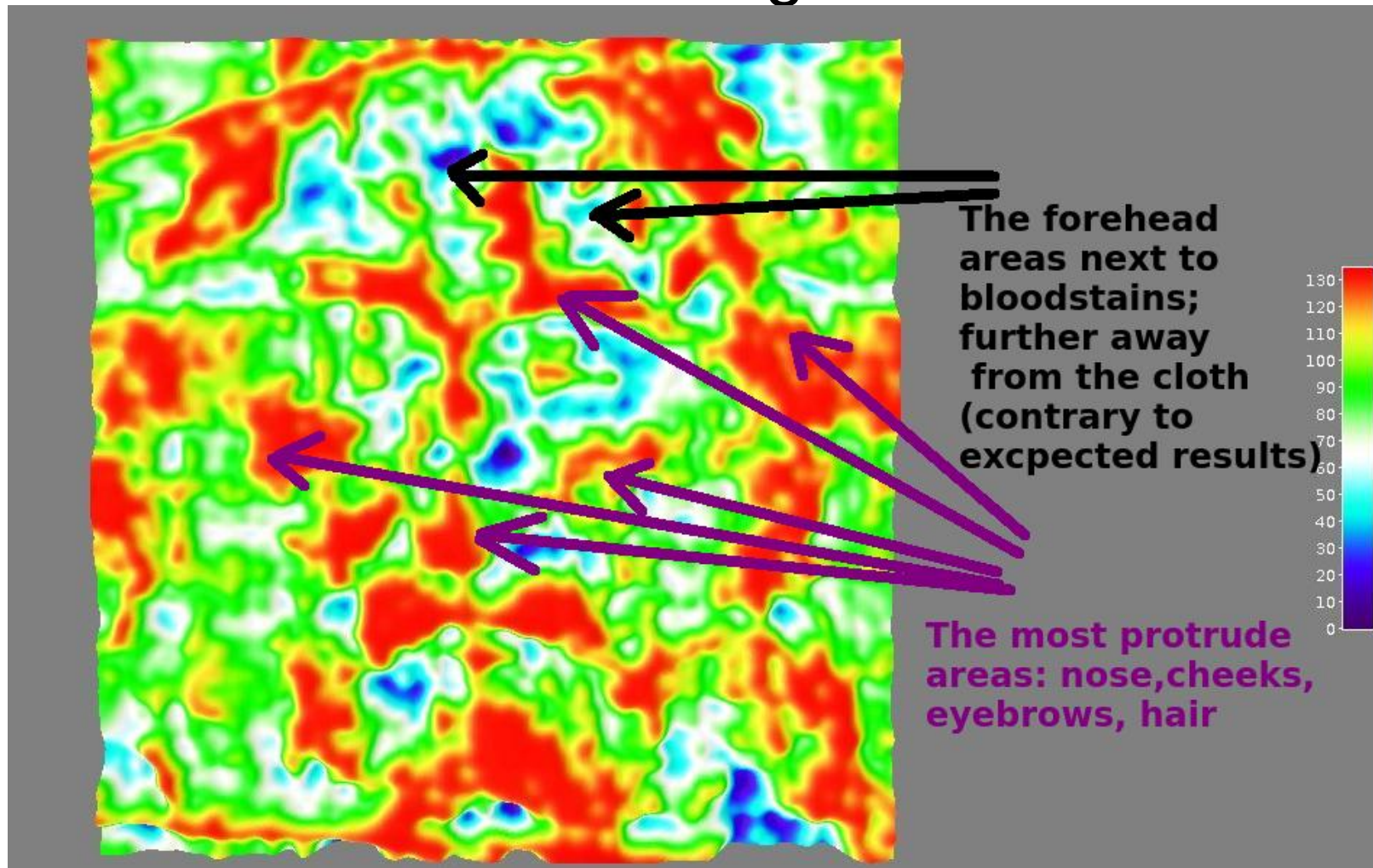


And here the same plot in 'Thermal LUT' mode. This is actually a 'topographic' map of Shroud face, showing areas in respective distance from the cloth, from direct contact to as far away as 2 cm.



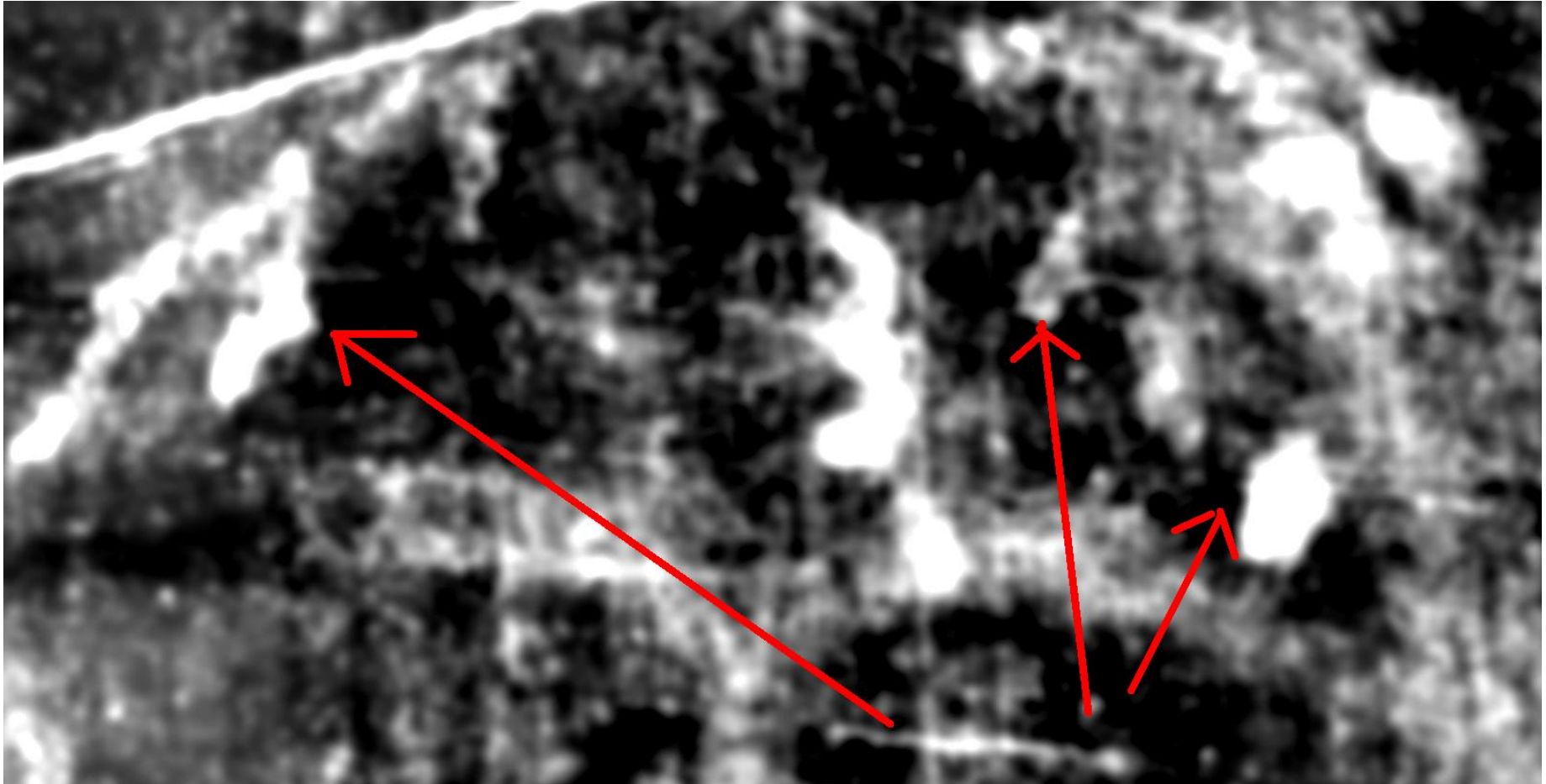
It should be stressed however, that this is a very **crude** map, as the possibility of processing artifacts is very high, so I don't advise to rely **too much** on it.

Problems solved, new problems appear; the forehead imageless areas



There seems to be a kind of anomaly in the forehead area. The intensity of the image seems to be falling down there, for unknown reasons. The areas near bloodstains, which should be in direct contact with the cloth, seem less bright, like if they were about 1-2 cm away from the cloth (or obscured by something)

Examples of imageless areas directly adjacent to the bloodmarks



It is hard to find an explanation for the presence of such imageless areas on the forehead:

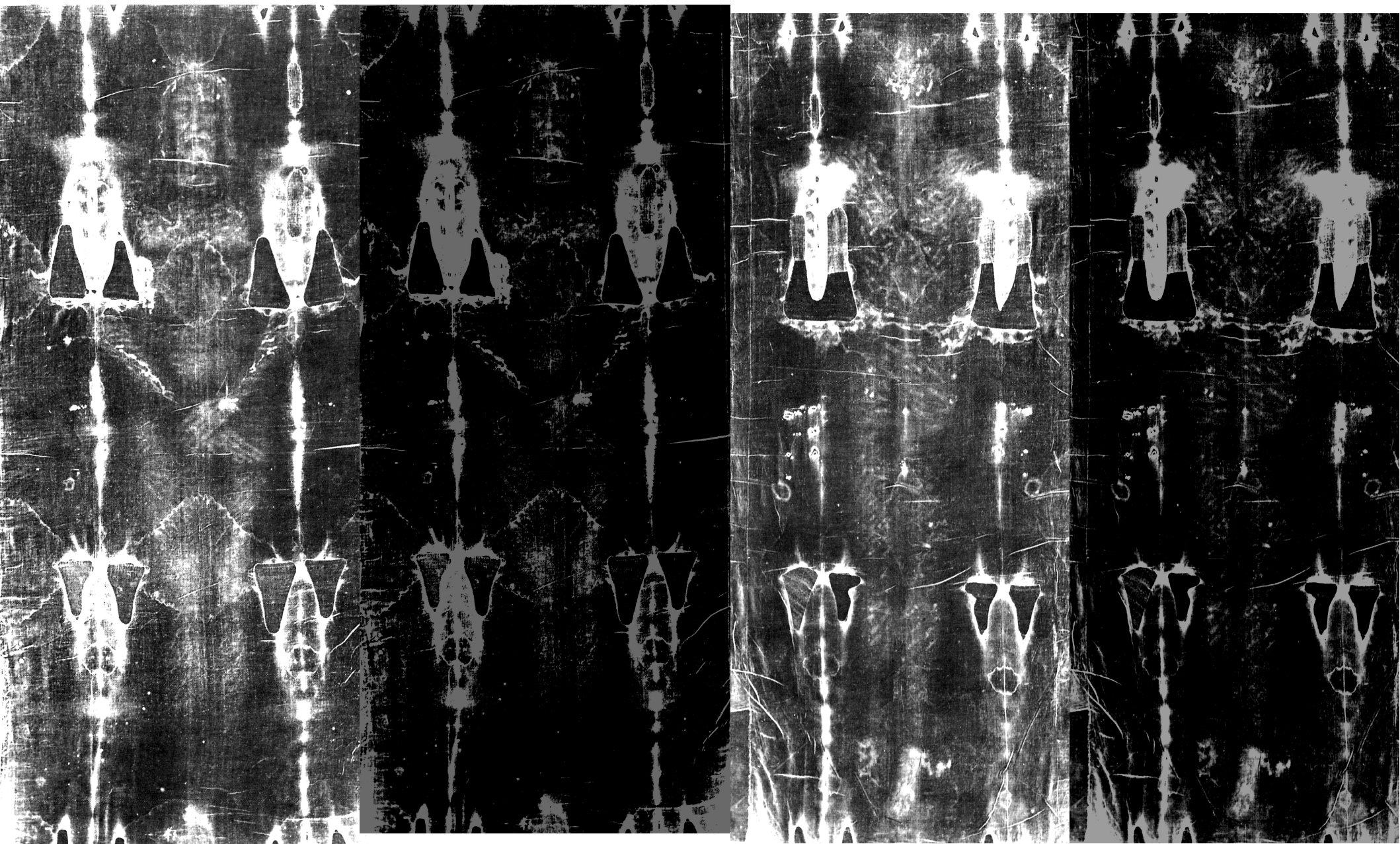
- There may be something (thorns stuck in the head?) that keep the cloth away from the body. Drawback: the imageless areas are directly adjacent to bloodmarks assumed in direct contact with the sheet.
- The image may be obscured by some secondary objects (flowers? Inscriptions? See Avinoam Danin's article "*Holes in the 3D-image of the body on the Shroud*" on [shroud3D](#)-image to the right from there). Drawback: hard to explain local attenuation (but not complete lack) of image in some other areas of the forehead next to bloodstains.



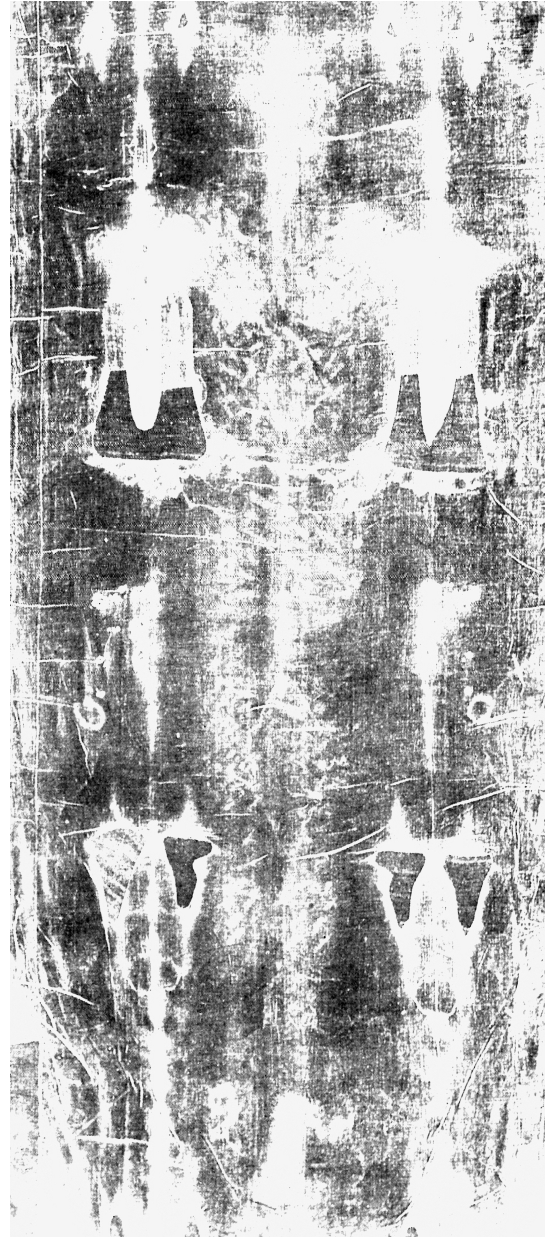
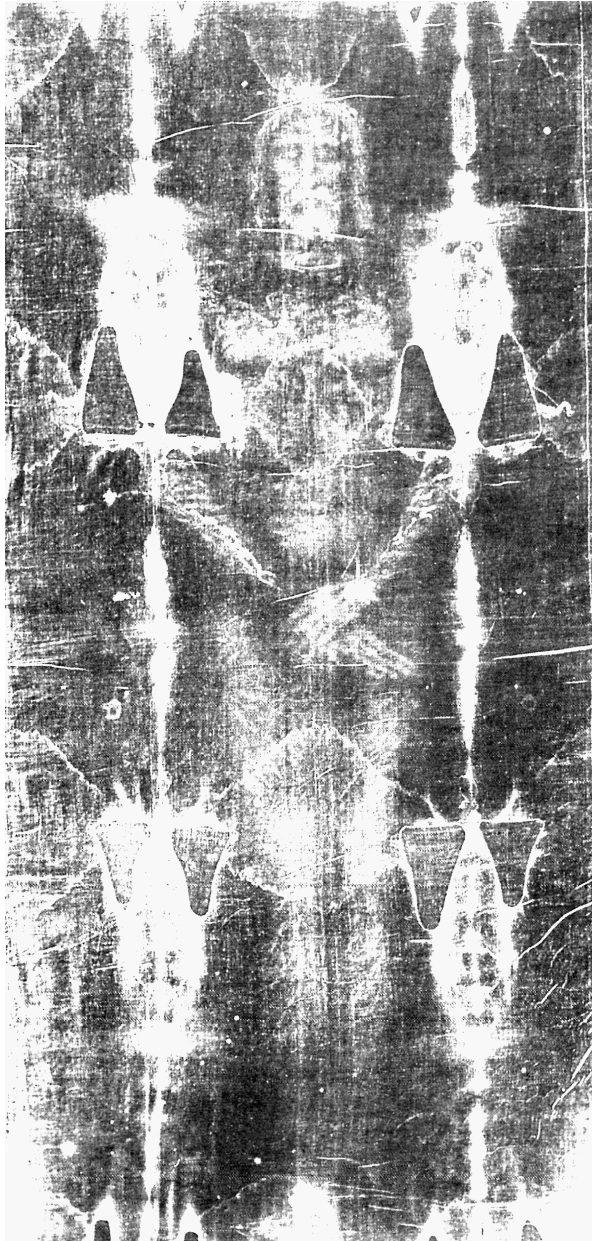
- The holes may be result of blood and/or serum which did not left imprint on the cloth. We know that there is no image below bloodstains. The problem: have areas covered in blood produced the image? Was the body washed before burial?
- There may be some local variations (random or systematic) of image formation process (see slide "Correlation vs Causation").
- There may be some systematic effects due to the cloth properties of the cloth and/or conditions when photographs were taken, photographs properties, and image processing (bandings? artifacts due to Inaccurate removal of them? inaccurate subtraction of blood and other image contaminations? etc.)

Whatever the reasons, it is definitely **too early** to make any far-going conclusions out of that.

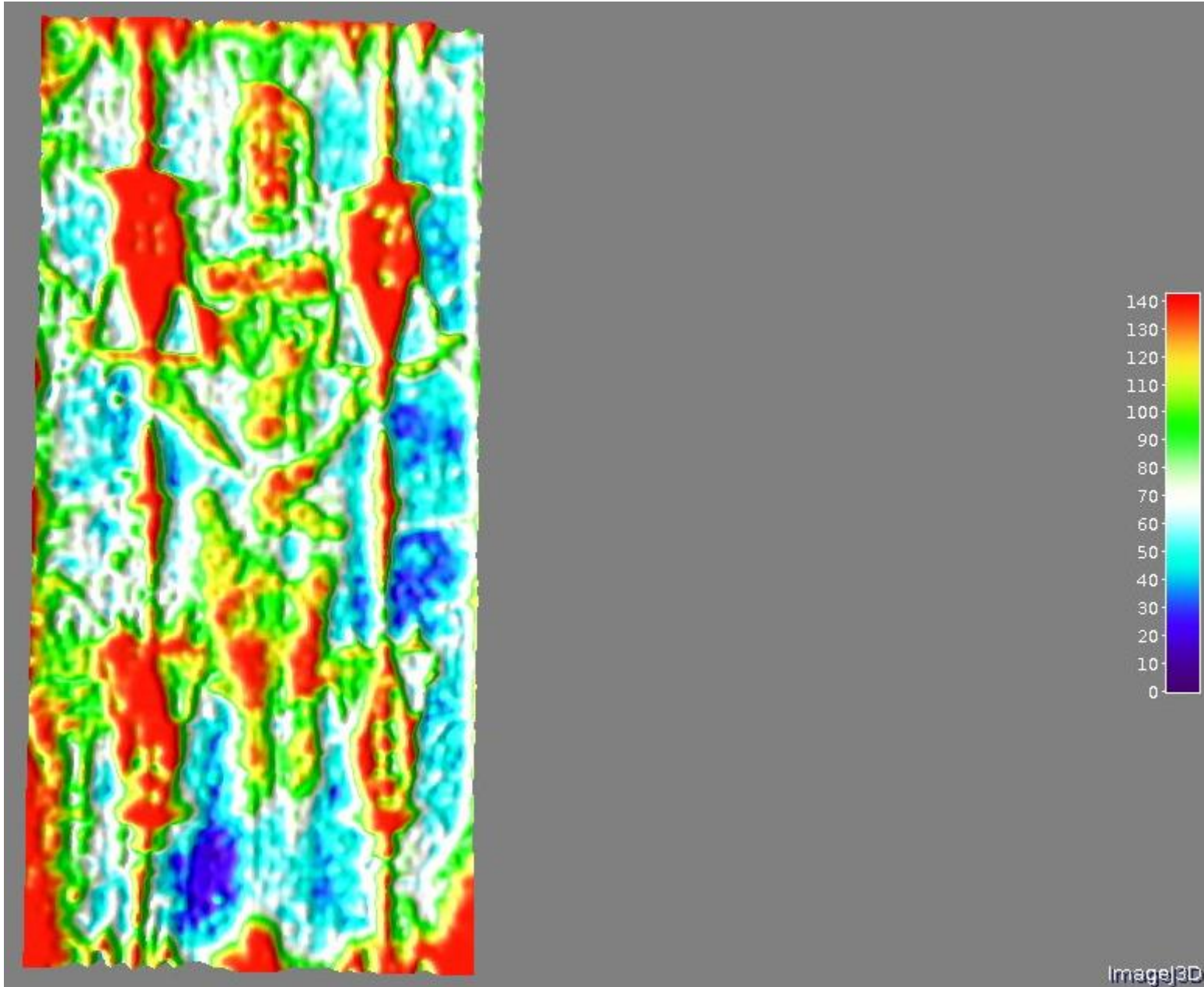
Let's try the same (to get rid of bloodstains etc.)
with the whole body images

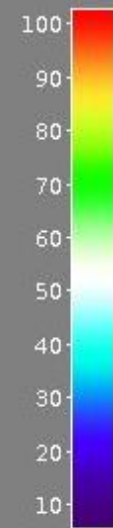
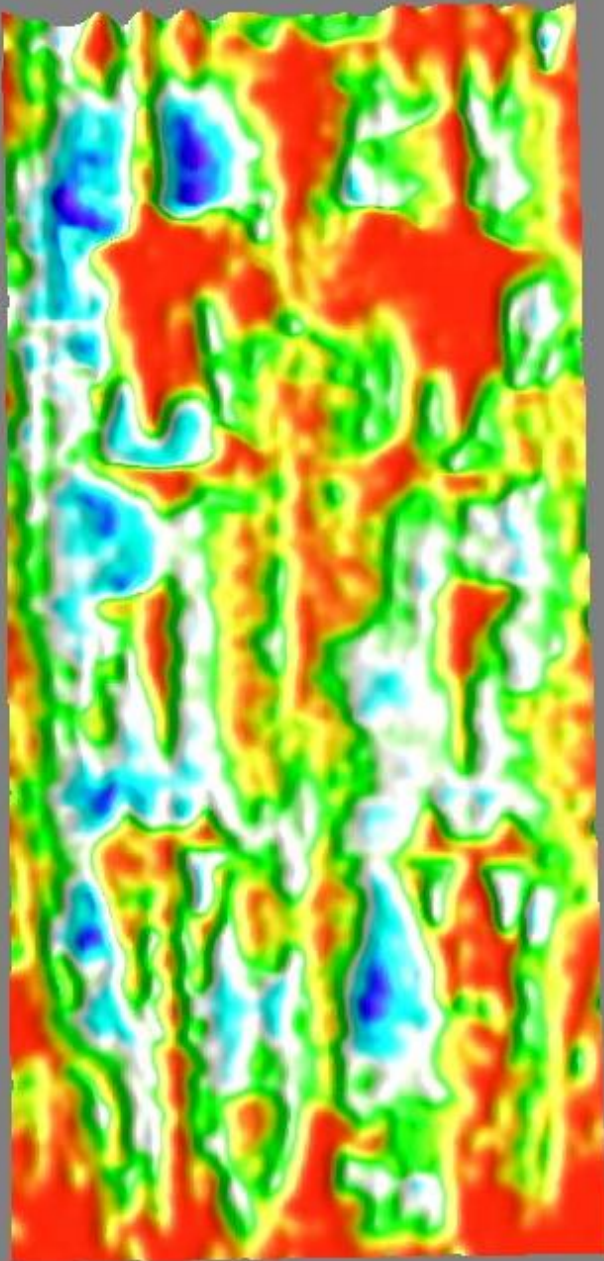


Results of subtraction

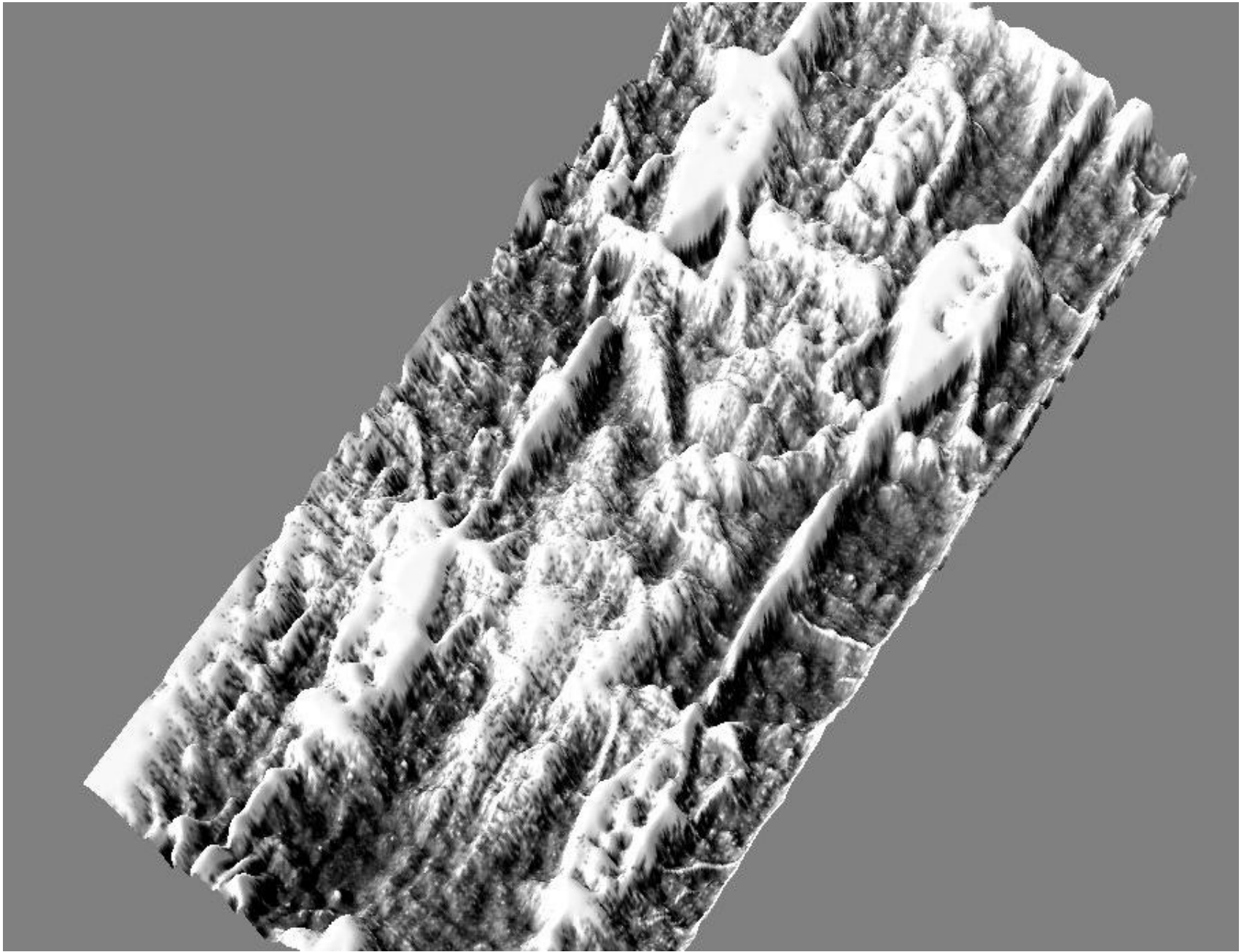


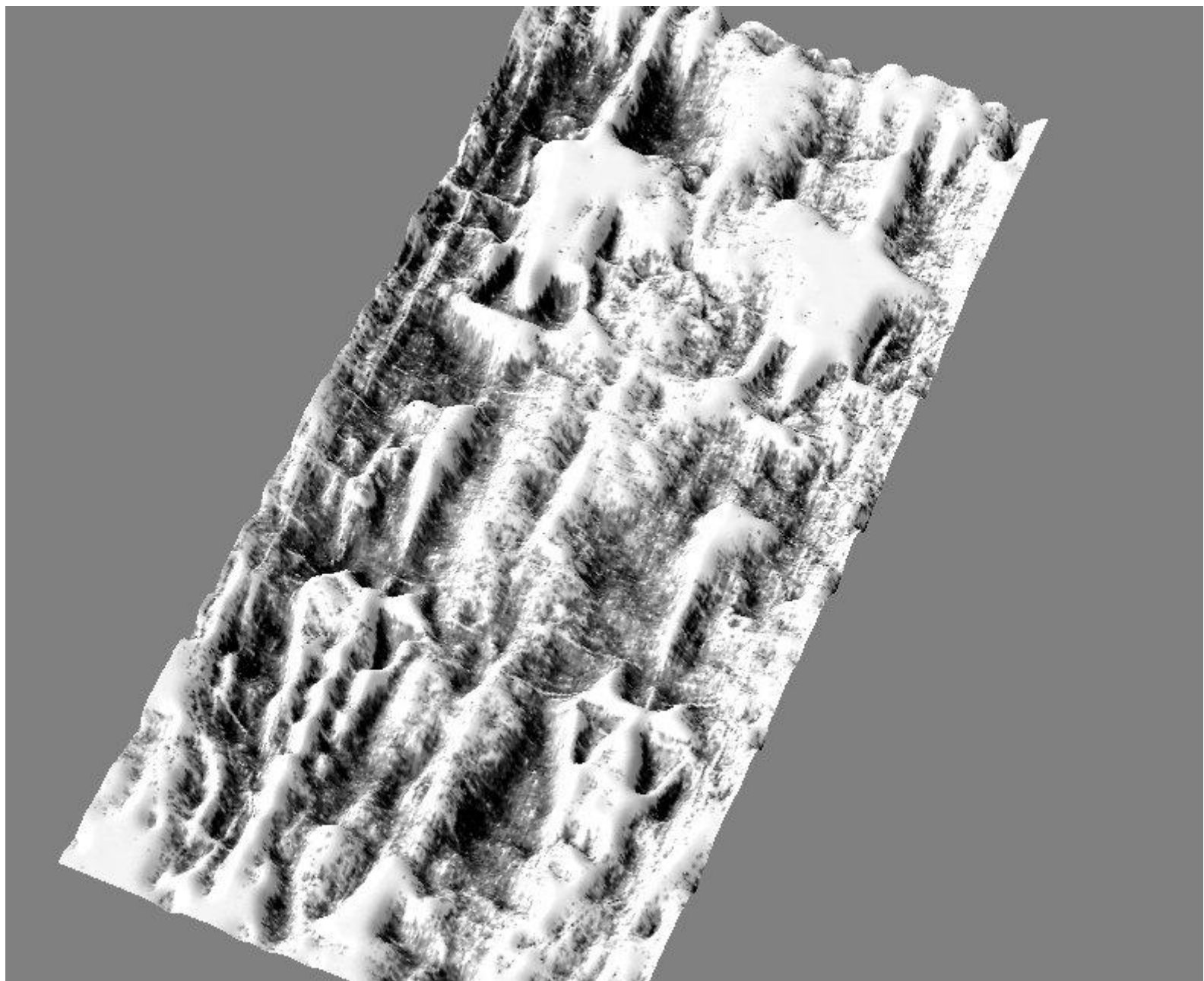
3D





ImageJ3D





The pictures (though still not perfect) do confirm that the body images on the Shroud show real 3D form of human body, although interpretations of each of the details require careful analysis

Overview



- To obtain as much accurate 3D representation of the body image, we must eliminate interference from systematic effects. There are more or less effective ways to do so.
- The analysis of forehead area reveals that there several areas with less intense image (or imageless) than expected from their proximity to the neighbouring bloodmarks. Current interpretation of that phenomena is unclear. There may be several possible explanations for that.
- Both front and back body images show real human-shape forms, although details need to be **carefully** worked out.

Further prospects

This presentation certainly will be expanded in the future. New features will include:

- Detailed comparison of the attempts to reproduce the Shroud with the original.
- Examination of several other areas of body image on the Shroud
- Discussion of Shroud's **speculative** holographic properties
- Enhanced explanations of physics behind the Shroud's and its attempted copies observational characteristics (and perhaps VP-8 working principles)
- My response to the issues raised in the eventual discussion of the topic.