



**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

# Superficial Deposits Thickness Models: Differences between BSTM and ASTM, Basic and Advanced Superficial Thickness Models

Information Products Programme

Internal Report IR/06/103



BRITISH GEOLOGICAL SURVEY

INFORMATION PRODUCTS PROGRAMME

INTERNAL REPORT IR/06/103

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R.S. Lawley

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*Parent Body*

### **Natural Environment Research Council, Polaris House, North Star Avenue, Swindon, Wiltshire SN2 1EU**

☎ 01793-411500 Fax 01793-411501  
[www.nerc.ac.uk](http://www.nerc.ac.uk)

# Foreword

The Superficial Deposits Thickness Models, SDTM, were BGS's first attempt to create a nationwide model of the thickness of superficial deposits. The models created were a simple mathematical interpretation that provided indicative values of thickness and no definite values. They should not be used as a substitution of a thorough site investigation,

This first attempt created two different models from nearly the same data, the BSTM and the ASTM, Basic and Advance Superficial Thickness Models. Their differences relied mainly in the methodology used to create them.

For the purposes of modelling, superficial deposits include sediments deposited during the Quaternary, subsequent Holocene rivers and coastal systems and also modern anthropogenic material. i.e. deposits that are less than 2.6 million years old.

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# Summary

This report describes the main differences between the two thickness models ASTM and BSTM, Advanced and Basic Superficial Models.

Why from nearly the same data we have different models? What information does each one provide? When should I use one and not the other? All this questions can be answered if we understand the differences of the two models and how they were created.

# 1 Introduction, Understanding ASTM and BSTM, (Which one should I use?)

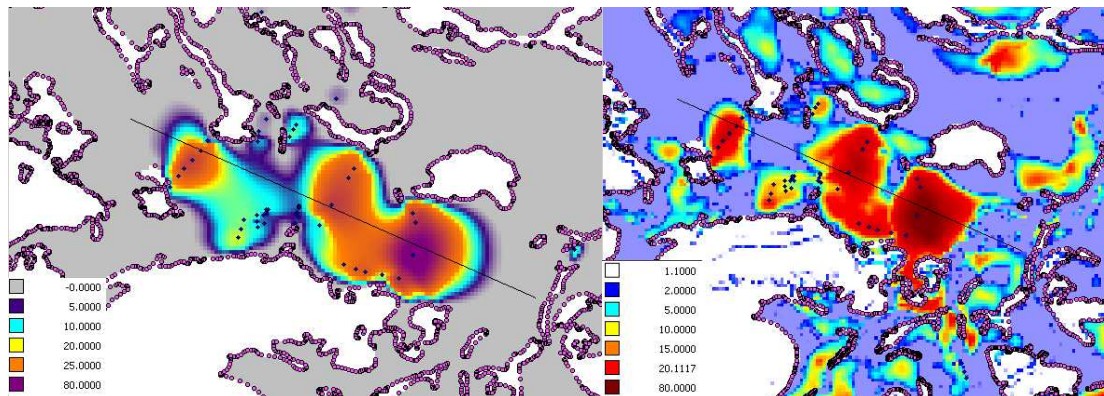
The first attempt from BGS to create nationwide Superficial Deposits Thickness Models produced two different products depending on the methodology used. These simple mathematical models gave an indication of thickness, but this indication is different in the two models why is this? Which one should I use in my project?

How the models were created and their limitations have been already described in “*Making SDTMs*” (Lawley and Garcia-Bajo 2003) and in “*Generation of Superficial Deposits Thickness Models and Rockhead contours for Great Britain*” (IR 04/082R Garcia-Bajo and Lawley 2002) internal reports.

## 1.1 A QUICK VISUAL COMPARISON BETWEEN THE TWO MODELS

BSTM (direct method)

ASTM (derived method)



**Figure 1 Outline of the cross-section for both models and borehole distribution.**

The grey areas in the BSTM show an indication of where there should be Superficial Deposits. We do not have borehole information in these areas so we show them as areas of minimum thickness of 1.5m.

In the ASTM we can appreciate that what in the BSTM was a grey area is now showing a thickness. This is due to the difference methodology used to create the models.

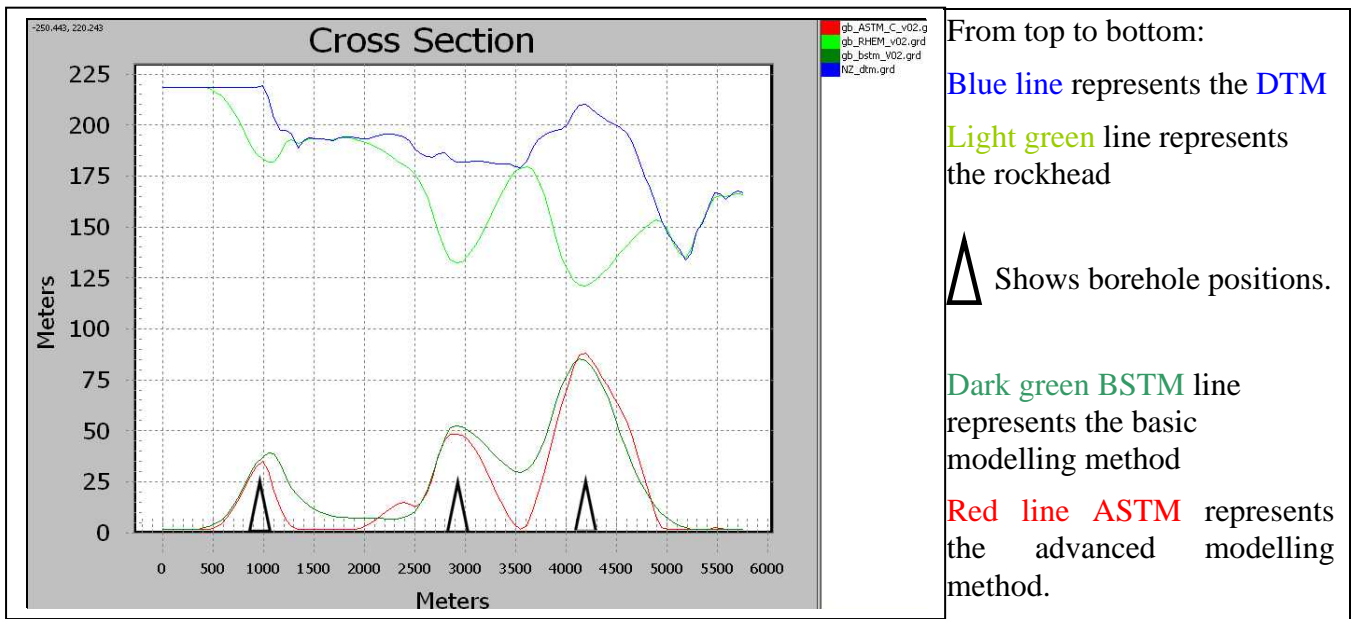
## 2 Methodology Differences

Both models were created using borehole data and Digmap data, but the main difference is that the ASTM or advanced model uses also a DTM ,Digital Terrain Model.

- BSTM is a direct interpolation of the data.
- ASTM is a derivative model, the result of subtracting from the DTM the thickness given by the data.

This means that ASTM is highly influenced by the DTM used.

### 3 Comparison



**Figure 2 Cross-section of the line represented in Fig1**

The Rockhead was created from borehole data and DigMap data. We can see in this cross section (fig2) the strong influence of three boreholes (3 arrows) in the Rockhead, ASTM and BSTM.

The **ASTM** model, Advance superficial Deposits Thickness Model, is the difference between the **rockhead** and the **DTM** (green line and the blue line). We can see very clear how this line is less smooth than the **BSTM** (fig2), this is because o the influence of the **DTM**.

The **BSTM** is just the direct method modelling technique, the interpolation resulting from the boreholes and Digmap. It is the factual data grid.



## 4 Discussion

The ASTM reflects better the thickness distribution in a more natural look. It shows some features that are not present in the BSTM, but that have been inherited from the DTM used in its creation. The use of the DTM has made us to blank some areas (where no 50k mapping was available) because the difference between digmap625k and DTM resolution was so big that the result was not useful at all. The ASTM is then a better grid, but it will give too big thicknesses in areas of great relief. So if you are working in a mountainous area it might be better to use the BSTM.

The BSTM shows the real information held in BGS boreholes. It shows areas where we know for "sure" the thickness of the Superficial Deposits (or areas where we have data to back this up). Bullseyes help in the identification not only of spurious data but also of buried channels, eskers and other geological features. The downside to it is that lots of areas only show a minimum of thickness, (1.5m) even though we know they might be greater we can not show it in this mathematical model.

In conclusion, depending the work you are doing and how you are using the data, one might be more useful than the other. The best thing is to always use both and see which one gives you a result nearer to what you expected.