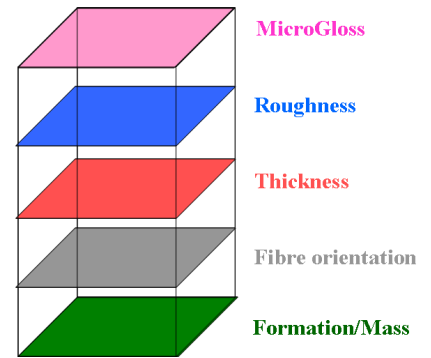


Local property correlation

Find new important correlations between paper and print properties

November 2012



It is increasingly important to measure different properties in the paper structure and on the paper surface at a local level to find how they may depend or affect each other. Understanding how different properties are interlinked increases the ability to make better products.

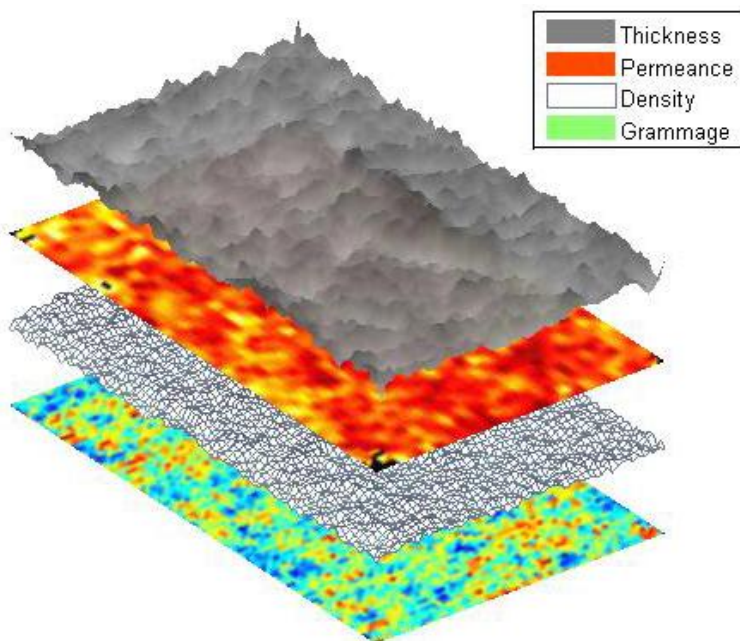
- We can measure a number of different properties on the same area of one sheet and find out if they correlate or not at a local level.

The properties

Different properties require different resolution and sample size to give meaningful results. Some properties like fibre flocs, cockling etc. require a large image size (200 mm x 200 mm) and medium resolution (1 mm x 1 mm), while properties like missing dots, mottle and gloss variation need a higher resolution (≤ 0.1 mm x 0.1 mm), but not necessarily a large image size.

We can measure these properties at a local level as 2D maps:

Surface, Reflectance (for example print and missing dots), Permeance, Thickness, Mass distribution (beta formation), Cavities in a compressed paper surface, Optical formation, Density, Gloss, ZD-stiffness.

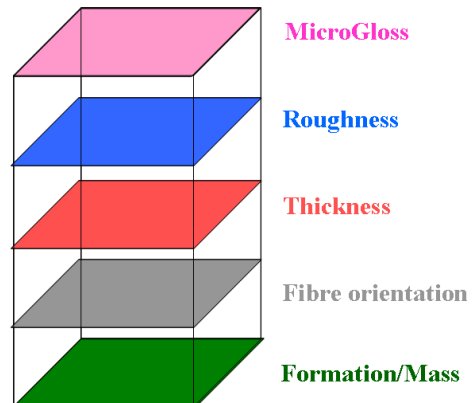
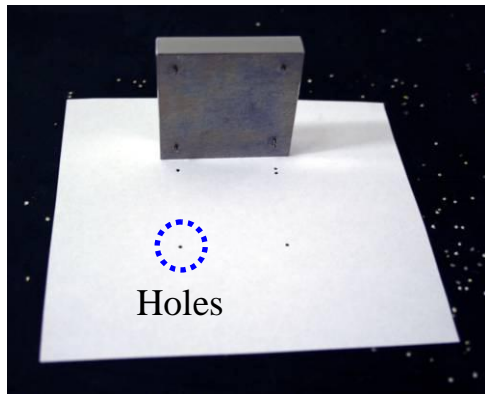


Example:

Four properties measure as 2D-maps and matched to get in register to each other.

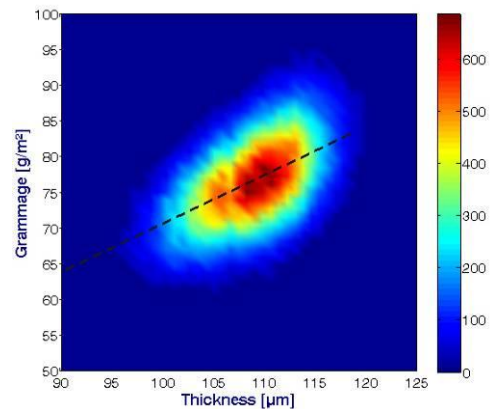
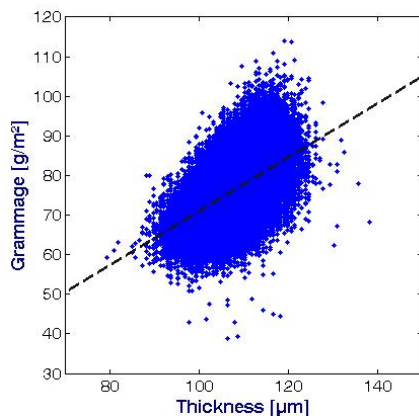
How this is done and what you get

The result consists of correlation plots, obtained from the following steps:



1. The sample is marked for matching and images are captured using different techniques to measure the desired properties.

2. The images are matched in x,y to be able to compare properties at a local level. This is made using the registration markers and dedicated software.



3. Correlation plots are produced, in this example a high correlation between thickness and grammage (not surprisingly). $R^2= 0.30$ and slope = 0.68. In this example the area was 30 mm x 30 mm and the resolution 0.1 mm.

4. The 2D histogram of the same data. The red area in the plot shows that the most common combination of the 0.1 mm x 0.1 mm spots is thickness in the range 105 to 115 μm and grammage 70 to 85 g/m^2 .

Contact

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