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Short timescale wetting and liquid penetration on porous media, an experimental approach

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Paper curl due to wetting and drying is known to be determined by the degree of fiber swelling, the paper structure and material inner tensions from the paper production process which are released due to wetting. Apart from these well documented processes we have found that the development of paper curl is governed by different mechanisms depending on the observed time domain.

Our investigation shows that different curl mechanisms are taking place during initial wetting, immediately after paper drying and during the first 48 hours after printing. Accordingly we are defining three different types of curl: initial wetting curl, short term print curl and long term print curl. Initial wetting curl is defined to take place in the first few seconds after contact with the printing ink. Short term print curl is defined as the paper curl occurring directly after printing and drying of the printed paper. Long term printing curl is the paper curl occurring 24 hours after printing and drying of the paper.

An analysis of the reasons for the development of paper curl in the different time scales revealed that initial wetting curl seems to be related to the fiber swelling, short term printing curl is related to the structure of the paper and long term curl is triggered by re-conditioning the paper after printing.

References

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