

Abstract Submitted  
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**Surfactant variations in porous media localize capillary instabilities during Haines jumps** YANIV EDERY, DAVID WEITZ, Harvard Univ, STEFFEN BERG, Shell Global Solutions International B.V. — We use confocal microscopy to measure velocity and interfacial tension between a trapped wetting phase with surfactant and a flowing, invading non-wetting phase in a porous medium. We relate interfacial tension variations to surfactant concentration and show that these variations localize the destabilization of capillary forces and lead to rapid local invasion of the non-wetting fluid resulting in a Haines jump. These spatial variations in surfactant concentration are caused by velocity variations at the fluid-fluid, and lead to localization of the Haines jumps even in otherwise very uniform pore structure and pressure conditions. Our results provide new insight into the nature of Haines jumps, one of the most ubiquitous and important instabilities in flow in porous media.

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