1086-AE-573      **B. S. Tilley\*** (`tilley@wpi.edu`), Dept. Mathematical Sciences, 100 Institute Road, Worcester, MA 01609, **D. W. Schwendeman** (`schwed@rpi.edu`), Dept. Mathematical Sciences, 110 8th St., Troy, NY 12180, **C. P. Please** (`cpp@maths.soton.ac.uk`), School of Mathematics, University of Southampton, Southampton, England SO17 1BJ, United Kingdom, and **F. Hendriks** (`ferdi.hendriks@hgst.com`), 3403 Yerba Buena Rd, San Jose, CA 95135. *A Homogenization Analysis of the Compressible Flow Between a Slider and a Moving Rough Surface.*

The compressible flow between a slider and a moving rough surface is examined asymptotically and numerical in the limit of very small gap height. The amplitude and wavelength of the roughness are assumed to be of the order of the gap height. A two-scale homogenization analysis is employed to determine a nonlinear elliptic partial differential equation governing the leading-order pressure in the gap on the scale of the slider. The equation involves coefficient functions which are determined numerically by averaging Stokes flows on the scale of the roughness. Comments and a brief analysis is given on the reduction of the governing equation for pressure in the limit of long wavelength of the surface roughness. (Received September 07, 2012)