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## APPLICABILITY OF THE GIBBS EQUATION—DISCUSSION[1]

RUDY SLINGERLAND
*Department of Geosciences*
*Pennsylvania State University*
*University Park, Pennsylvania 16802*

Komar (1981) has correctly pointed out that the Gibb's equation predicting settling velocity of spheres in water is in error for densities substantially different from glass ($\rho_s$ = 2.24 − 2.488) and fluid densities other than water. Komar presented a correction factor as a function of sphere density with which to multiply a Gibb's-calculated settling velocity in order to obtain the correct velocity. For fluids other than water the primary $CdRe^2$ versus Re curves for spheres still must be used.

The purpose of this note is to point out that Warg (1973) already realized some of the shortcomings in Gibb's technique and presented a simple 50-line FORTRAN program to calculate accurate settling velocities for geologically interesting densities and fluids. The program uses the method first published in English by Wadell (1934) wherein a $CdRe^2$ versus Re curve is constructed from a Cd versus Re curve of experimental data. Warg uses the Davies' (1945) approximation to this curve rather than the tabled values of Komar. Settling velocities calculated from Warg's program and from Komar's Table 1 differ by less than about 0.2 percent. And the Davies' equations are easier to program and require less computer storage. Thus there is no need to use the Gibb's equation in the first place.

To back-calculate a sedimentation diameter from a given settling velocity, I have modified the Warg program to solve for the roots of a complicated polynomial in grain size using the Newton-Raphson technique. Readers desiring machine language copies of the Warg program and its inverse, presently running on a TRS-80 MODEL I with 32k memory, are invited to send me a formatted mini-floppy disc.

[1]Manuscript received February 22, 1982.

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