LUNAR SINUOUS RILLES: IS THERE A CORRELATION BETWEEN ERUPTION STYLE AND LAVA COMPOSITION? J.L. Whitford-Stark, Department of Geology, Sul Ross State University, Alpine, TX 79830.

An earlier study (1) showed that the lavas within Mare Imbrium could be separated into three distinct types; those with flow lobes and channels, those with sinuous rilles, and those with neither of the previous characteristics. It was suggested that these three types represent three different eruption styles. Data from Hulme (2) suggest that rilled flows are thinner, were erupted at lesser rates, and were emplaced over a significantly longer time period than channeled flows of similar volume. It was further found that in Mare Imbrium there is no correlation between the presence of a sinuous rille and lava age and but a slight preference for lavas with intermediate values of TiO_2 to be relatively rille depleted.

An analysis has been conducted for all the rilles on the nearside of the Moon which involves determining the composition of the lava associated with each sinuous rille. The primary data sources for this analysis are the lava composition maps of Pieters (3) and revised by Wilhelms (4). Wherever possible, higher resolution maps of surface composition have been employed (e.g., 5,6). The higher resolution maps more accurately define the lava composition since small patches of lava of differing composition are often omitted from the larger scale maps and many of the rilles are comparitively small-scale structures. A preliminary analysis using Pieters' terminology yielded the following results:-

LAVA TYPE	PERCENTAGE OF SINUOUS RILLES
HDSA	1.6
hDSA	18.7
HDWA	3.3
hDSP	3.8
hDW_	1.1
hDWA	2.2
mBG	0.5
mIG	11.6
mISP	3.3
LBSP	3.3
LBG	14.3
LIG	4.9
Dark Mantle	6.0
Cones	6.6
Unclassified	18.2

It can therefore be seen that sinuous rilles are not restricted to lava of a particular composition since almost every lava composition identified by Pieters contains a sinuous rille (the apparent exceptions being hDG and LISP which are restricted to small areas of Mare Nubium and Mare Crisium respectively). As was the case with Mare Imbrium, sinuous rilles appear to be

underrepresented in lavas of intermediate composition. Rilles are most common in the younger titanium-rich lavas of hDSA composition occupying large areas of Mare Imbrium and Oceanus Procellarum and the older titanium-poor LBG lavas in the vicinity of the Aristarchus Plateau.

Previous studies (7) have employed the dimensions of rilles and their source craters to determine the eruption conditions. Work is currently in progress to determine if there are any correlations between sinuous rille dimensions and lava composition.

References: 1) Whitford-Stark, J.L. 1983, *Advances in Planetary Geology,* NASA TM-85630, p. 190-288. 2) Hulme, G., 1973, *Modern Geology* 4, 107-117. 3) Pieters, C.M., 1978, *Proc. Lunar Planet. Sci. Conf. 9th,* 2825-2849. 4) Wilhelms, D.E., 1987, *U.S. Geol. Survey Prof. Paper 1348.* 5) Wilhelms, D.E., 1980, *U.S. Geol. Survey Prof. Paper 1046-A.* 6) Pieters, C.M. et al., 1980, *J. Geophys. Res. 85,* 3913-3938. 7) Head, J.W., and Wilson, L., 1980, *Lunar and Planetary Science XI,* pp. 426-428.