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GIS ANALYSIS OF UNIT DRAINAGE DENSITY AND ITS INFLUENCING FACTORS IN THE SOUTH FORK EEL RIVER (NORTHERN CALIFORNIA, U.S.A.)

ABSTRACT: SPAGNOLO M., *GIS analysis of unit drainage density and its influencing factors in the South Fork Eel River (Northern California, U.S.A.)*. (IT ISSN 0391-9838, 2002).

Unit drainage density and its influencing factors in the Eel River South Fork (Northern California) were analysed by means of GIS techniques.

The river network was automatically extracted from a digital terrain model (30 m resolution) by applying a contributing area threshold of 0.0225 km². The drainage density was evaluated within a constant unit area size of 0.16 km² for the entire river basin, obtaining a drainage density spatial distribution characterized by a low auto-correlation.

The unit drainage density (UD_a) map reveals higher values of UD_a along major valley axes and lower values predominantly

along ridges. With the use of GIS spatial analysis tools rock type, vegetation density and topography aspect and slope) were quantitatively correlated with unit drainage density.

The correlation analysis, tested with the Pearson correlation T-test, shows that the two most important influencing factors on UD_a are aspect and rock type.

In particular, UD_a is higher in NW-facing slopes and weaker rock types while it is lower in SE-facing slopes and harder rocks.

Finally, no evident relationship was found between drainage density, slope and landcover.

KEY WORDS: GIS, Quantitative geomorphology, Fluvial geomorphology, Drainage density, Eel River (Northern California, U.S.A.).

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