Astronomers Gull and Daniell have developed efficient noise-reduction techniques to enhance radio galaxy displays. They used the information theory notion of entropy with a chi-square constraint. In these conditions, the criterion derivatives provide separate equations to estimate each processed sample at a very fast computation rate. The chi-square constraint serves as a global constraint and ensures the continuity of the process over a given area and yields a confidence level for the results. The full confidence situation corresponds to the standard stack, whereas the zero confidence level corresponds to a flat distribution (trace). By slightly decreasing the confidence level from 100% confidence, meaningful noise reduction is achieved.

This technique is applicable to the noise reduction of seismic data. At each time sample of a deconvolved gather, the mean and the standard deviation are associated within the chi-square constraint to generate a new stack estimator. Such a process may be effective in sharpening velocity analyses. This is shown on both synthetic and real data. This nonlinear constraint method can be advantageously compared with more classical semblance or coherency technique with respect to computer time and the number of selected parameters is minimum.

Bryan and Skilling tried a new statistic in order to obtain a better distribution of noise residuals. The proposed solution consists of constraining the standardized and ordered residual components of the chi-square to fit a theoretical normal distribution. In fact, the solution can be made more general according to the noise distribution, inferred experimentally from the data.

Attempts have been made to apply this technique to the same seismic data sets. The Gull and Daniell technique provided a first estimate, which served as a starting point for the second technique. Convergence was obtained after a few iterations and improvement of the solution with respect to a normal distribution was checked through a chi-square goodness-of-fit procedure.

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Geology and Slope Stability of Point Delgata, California

Two bedrock complexes crop out at Point Delgata in northern California: a Franciscan melange complex composed of sedimentary rocks, pillow basalts, and glaucophane schist; and the Franciscan coastal belt complex composed mainly of interbedded shales and sandstones. Two Quaternary formations largely cover these bedrock complexes.

The major geologic structure is the northwest-trending San Andreas fault, which cuts Point Delgata and forms the contact between the two Franciscan bedrock complexes. This active fault has extensively deformed the Quaternary deposits. The Franciscan coastal complex has numerous folds with axes subparallel to the trace of the fault.

Over 50 recent slope failures have occurred within the mapped area. Rotational slumps and debris flows within soil horizons are most common. The predominantly sandy soils of the area were found to have an average angle of internal friction of 31.4°, and cohesion strength of 7.0 kg/m^2.

Under static condition, slopes greater than 40° are basically unstable, but, during a major earthquake, condition slopes greater than 20° would likely be unstable.

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Sedimentology of Upper Cretaceous Submarine Fan Strata, San Miguel Island, California, and Comparison to Selected Mainland Localities

Upper Cretaceous sandstone, mudstone, and conglomerate are exposed in an eastward-dipping homoclinal sequence at the western end of San Miguel Island. These strata were deposited in the inner, middle, and middle-fringe regions of a submarine fan during the Campanian and Maestrichtian Stages. Outer fan and basin-plain sedimentary rocks are absent, whereas thick sections of mudstone-dominated strata deposited in fan-fringe areas abound. The great thickness of the middle-fan fringe facies suggests that these rocks were deposited in an elongate basin, the long axis of which was oriented normal to the direction of sediment transport.

The middle-fan fringe strata on San Miguel Island are characterized by rhythmically interbedded mudstone, siltstone, and sandstone commonly found in thickening-upward sequences. The mid-fan strata are distinguished from outer fan and basin-plain deposits by the facies occurrence along strike from mid-fan channelized sequences, by paleocurrent indicators which trend subnormal to channel orientations, and by large- and small-scale slumping subnormal to channels.

The conglomerate clast suite on San Miguel Island is dominated by durable, but brittle, black dacites and plutonic rocks. Some black dacite clasts were shattered during transport to produce black sand grains that have given the sandstones a salt and pepper appearance.

Upper Cretaceous submarine fan strata in San Diego County contain a much smaller percentage of black dacite clasts than on San Miguel Island, but both are overlain by the same Eocene submarine fan strata dominated by Poway rhyolite clasts. This relationship suggests that these rocks were deposited as two separate, but closely adjacent, submarine fans which received coarse clastic detritus from similar and overlapping volcano-plutonic source terranes.

The Upper Cretaceous strata on San Miguel Island have been referred to the Jalama Formation as established on the mainland. However, the clast suites of the Jalama conglomerates in Santa Barbara County are dominated by metamorphic rocks which indicate a source terrane very different and separate from the volcano-plutonic dominated highlands that supplied detritus to the San Miguel Island and San Diego fans. Thus, the name Jalama Formation should not be used on San Miguel Island.

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Sedimentology of a Middle Tertiary Paludal Deposit, Northern San Joaquin Valley, California

The middle Tertiary Valley Springs Formation is characterized over much of its surface and subsurface extent in the northern San Joaquin Valley by yellowish- to greenish-gray claystone with crude wavy bedding and common clay-lined partings, fractures, and tubules. Common glass shards and pumice grains in this lithofacies have led previous workers to interpret it as altered vitric tuff or welded tuff, but the presence of unaltered glass in the claystone and in the interbedded vitric tuff argues against such a simple genesis.

Analysis of the mineralogy, chemistry, fabric, and organic content of a 26 ft (8 m) thick section at Wallace, Calaveras