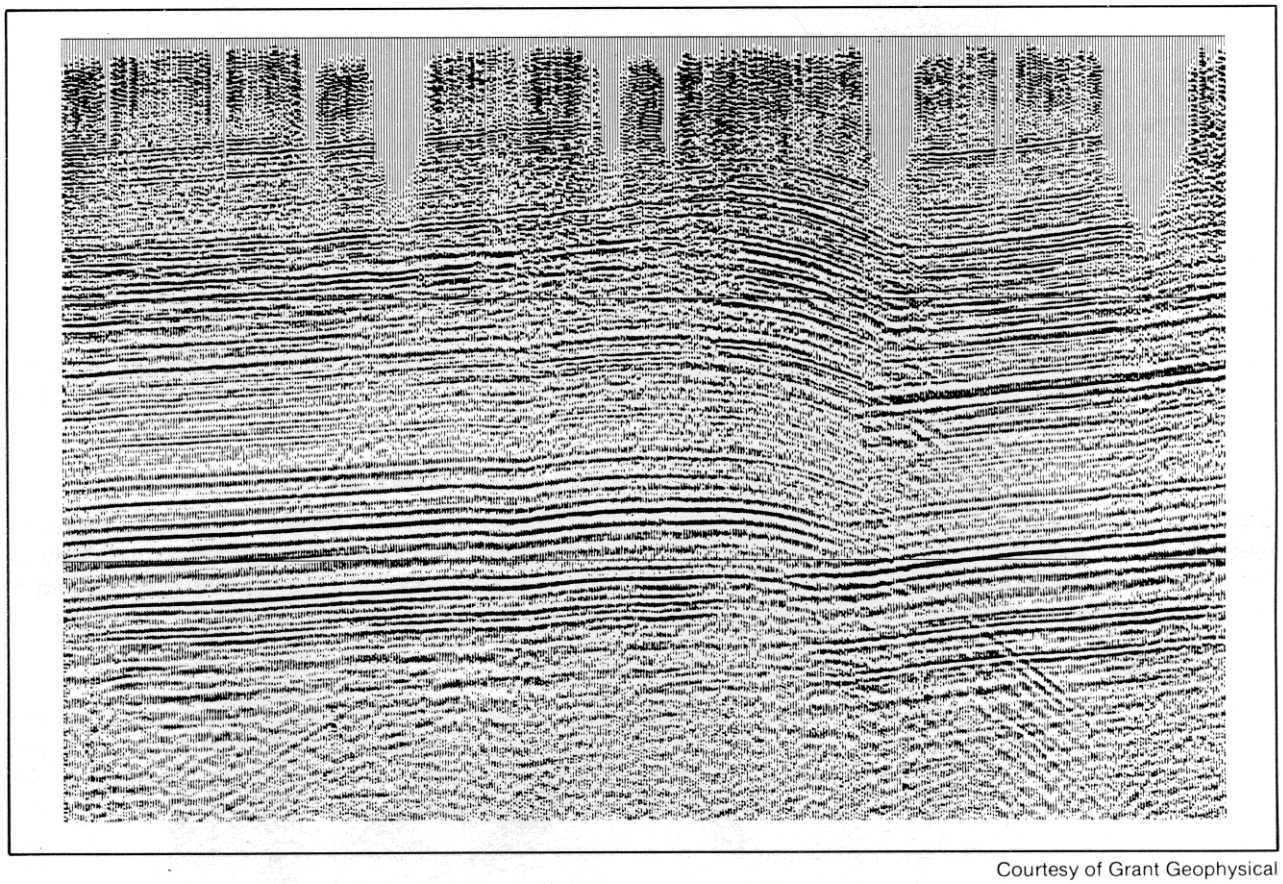
TECHCO GEOPHYSICAL SERVICES LTD.

MASTT

Residual Static Software for 2D and 3D Data



Courtesy of Grant Geophysical

For Large Static Corrections
For NMO problems
For Reliable Stratigraphic Interpretations

For Further Information Please Contact:

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MASTT fits a set of time shifts to NMO corrected seismic data according to the model

$$t = s + g + c + ax^2$$

where t is the total shift of any seismic trace from some arbitrary reference time

s is a shot static

g is a geophone static

c is a function of CDP position. It will relate to structure

a is a function of CDP position. It will relate to residual NMO

x is the shot to group distance

This formulation may be written in matrix notation, eg.

$$\mathbf{T} = \mathbf{R} * (S_1S_2 \ldots S_nG_1G_2 \ldots G_mC_1C_2 \ldots C_1A_1A_2 \ldots A_1)$$

T = vector of time picks

R = matrix determined by the geometry of the input traces

S = vector containing all shot statics

G = vector containing all geophone statics

C = vector containing all c values

A = vector containing all a values

MASTT picking algorithm calculates the **T** vector. Each trace is cross correlated with other input traces and is picked by multiple independent sub-algorithms. These are optimized for different types of data problem so that picking reliability is maintained as data quality changes.

MASTT solution algorithm derives the **S**, **G**, **C**, and **A** vectors. Instead of the conventional Gauss Seidel solution, **MASTT** uses a median value solution. There are good reasons why the error distribution function of the picks for each station should be non-Gaussian; they may be biased to one side, and cycle skipping yields multiple maxima. In these circumstances, the median solution is often closer to the correct value than the least squared error solution.

SURFACE CONSISTENCY FOR RELIABILITY. The time shifts applied to the data are the sum of shot consistent and geophone-consistent times only. The **C** and **A** vectors (above) are constrained to vary slowly and the **S** and **G** vectors are constrained to zero mean. Normally (depending on geometry) the surface consistent solution is over constrained, ie it has many estimates of each independent variable. The advantages can be:

- greater accuracy of statics for an improved stack
- less possibility of measuring statics from coherent noise alignments
- improved consistency of wavelet shape in transitions from good to noisy parts of a seismic line
- recording and processing errors will be obvious mis-stacks reducing the risk of false interpretation as geological changes

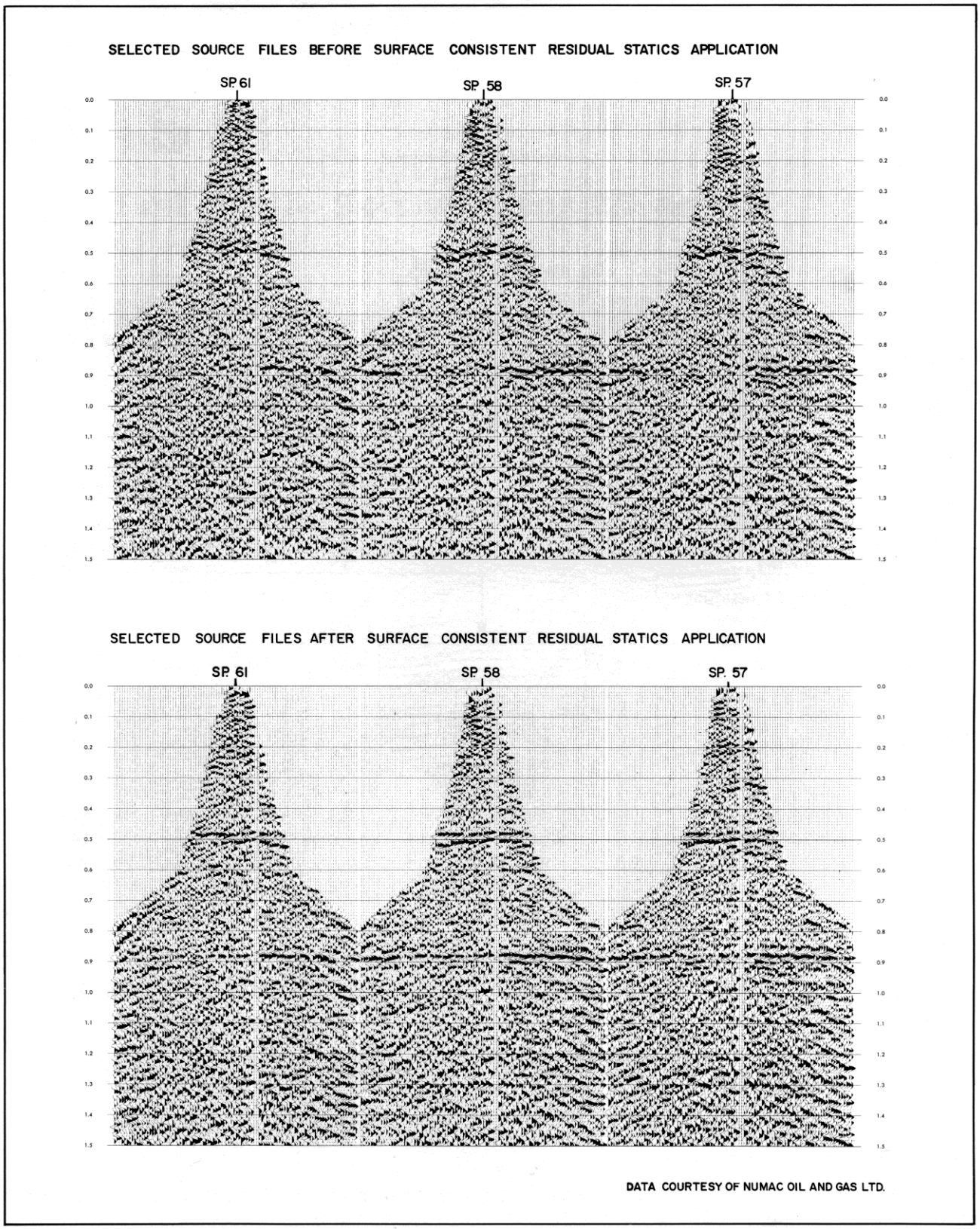
MASTT3D is a true 3D process without bias in any one direction.

NOISE IMMUNITY

MASTT uses a solution algorithm developed to use only the most consistent time estimates and ignore those which may be due to cycle-skipped or noisy time picks. A median value criterion is used.

LARGE STATIC CAPABILITY

The **MASTT** picking algorithm treats each trace independently without assuming structural consistency before the solution phase. It is well suited to data with static shifts of one half wavelength or greater.



NMO INDEPENDENCE

Stacking velocity estimates are strongly influenced by static corrections. In problem areas stacking velocity estimates made before residual static corrections fluctuate far more rapidly than can be accounted for from true geological velocity changes. The ax^2 term above allows **MASTT** to pick static corrections from data with poor NMO, making the following processing sequence possible: