

Objective - To become familiar with seismic migration by:- 1) using simple idealized data and a graphical technique to introduce the basic concepts of migration, 2) applying a time migration process to a real seismic data set collected over a synclinal (folded) structure, using the F-K migration function of VISTA.

Data supplied:

For the graphical exercise you are supplied with an idealized velocity model section (upper plot) and a seismic reflection section (lower plot) on one sheet of paper, plus a suite of maximum convexity curves. For the VISTA processing exercise you are supplied with a stacked seismic time section (s:mig.sgy) as well as a velocity estimate file (s:mig.vel).

Background: Read the Laboratory Manual notes on seismic migration (S4).

1. Graphical Migration

Use a graphical technique to determine a) the seismic reflection section for the given velocity model, and b) the idealized structural section (hint: the reflectors consist of straight segments) for the given seismic reflection section (note that the vertical axes on this plot is an apparent depth and not a two way reflection travel time). You may either employ the suite of maximum convexity curves supplied or construct wavefronts using a compass. The diagrams are all drawn assuming a constant propagation velocity and 1:1 vertical-to-horizontal scales.

2. F-K Migration Processing of a Real Data Set

First, read and plot the supplied data.* Then, in VISTA, apply the FKMIG function to the data, using the supplied velocity estimate file. You will also be prompted for 3 additional parameters, which should be given as :

W-factor	=	1.0
Base velocity	=	5000 (m/s)
Trace distance	=	100 (m)

Responding yes (Y) to the plot option gives an interesting plot of the F-K amplitude spectrum of the data, and shows how it is altered by the migration process.

Make a plot of the migrated data and compare the results with the original data at the same scale.* Identify a series of reflector surfaces in the migrated section and indicate their corresponding events in the unmigrated section.

Note that migration requires a lot of memory. Make sure you have at least 10MB of free space on the disk before starting FKMIG. During program execution, you should only work with one register of this data at any given time.

**The most interesting part of the section lies in the range 2000-8000 ms. Plot this range only to get every trace on the screen.*