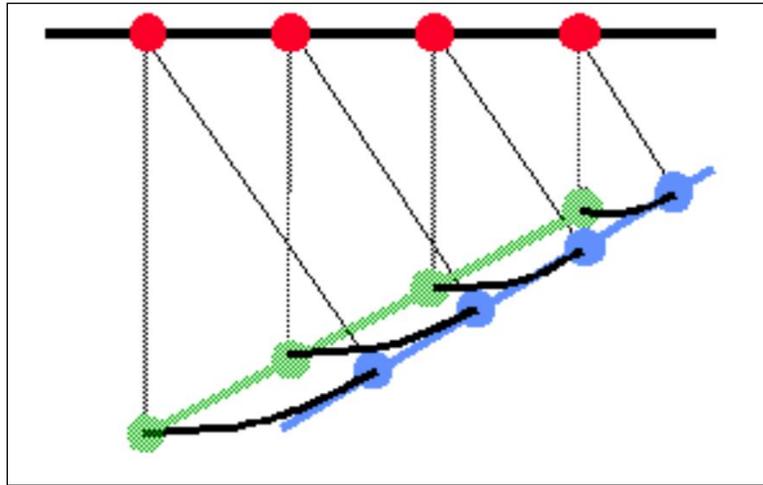# Chapter 7

Figures

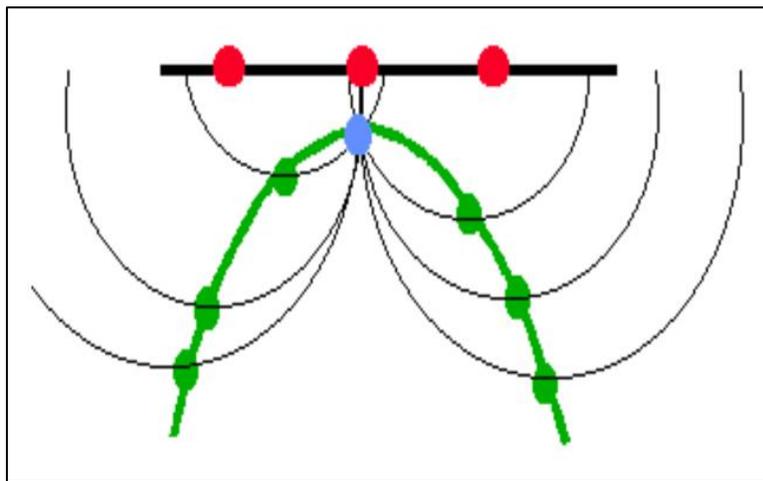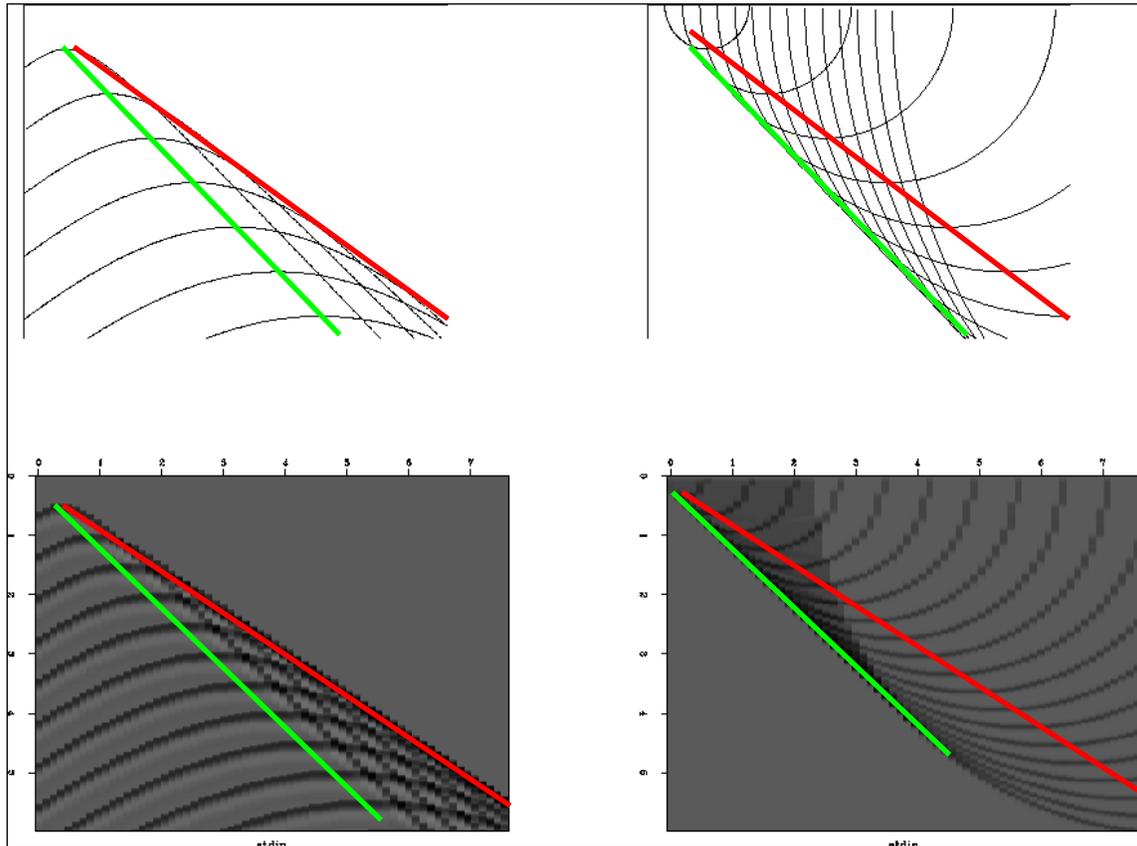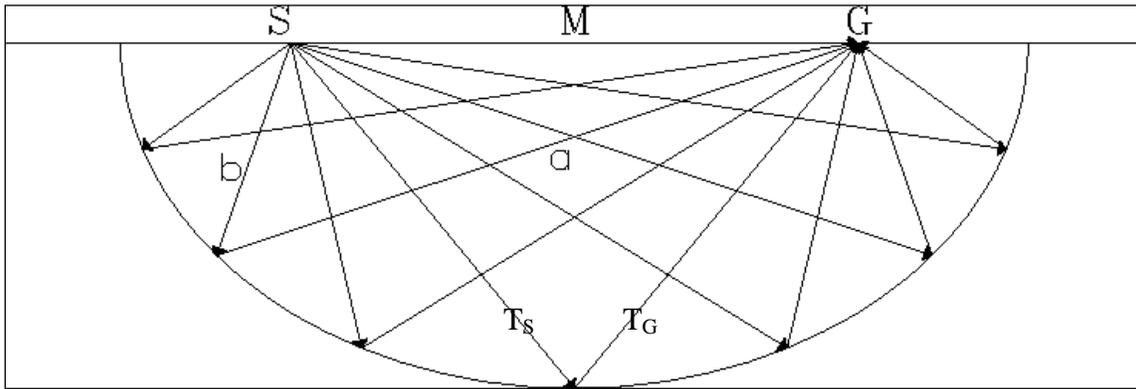**Figure 7.a**

Figure 7.b

Figure 7.1

Left is a superposition of many hyperbolas. The top of each hyperbola lies along a straight (green) line. That line is like a reflector, but instead of using a continuous line, it is a sequence of points. Constructive interference gives an apparent (red) reflection off to the side. Right shows a superposition of semicircles. The bottom of each semicircle lies along a (red) line that could be the line of an observed plane wave. Instead the plane wave is broken into point arrivals, each being interpreted as coming from a semicircular mirror. Adding the mirrors yields a more steeply dipping (green) reflector (sepwww.stanford.edu).

———— Unmigrated
———— Migrated

Figure 7.2

Prestack migration ellipse, the locus of all scatterers with constant traveltime (T_S+T_G) for source S and receiver G (sepwww.stanford.edu).
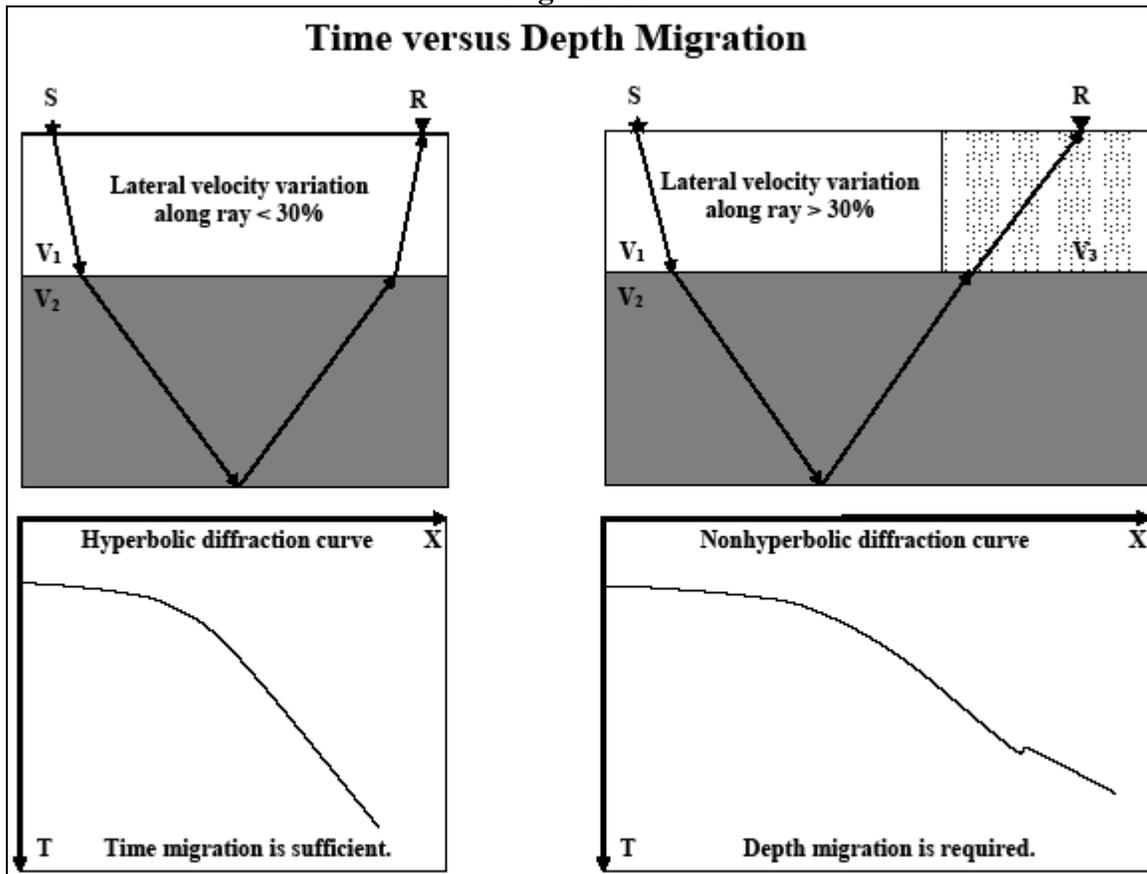
Figure 7.3

Time versus Depth Migration

Lateral velocity variation along ray < 30%

V_1
V_2

Hyperbolic diffraction curve   X

Time migration is sufficient.

Lateral velocity variation along ray > 30%

V_1
V_2
V_3

Nonhyperbolic diffraction curve   X

Depth migration is required.

Figure 7.4a

Migration Mistie

Figure 7.4b

2-D Migration

**Inline stacked
unmigrated section (input)**

X

T'   •P'

T

**Crossline stacked
unmigrated section (input)**

X

T'   •P'

T

Inline stacked migrated section (output)

X

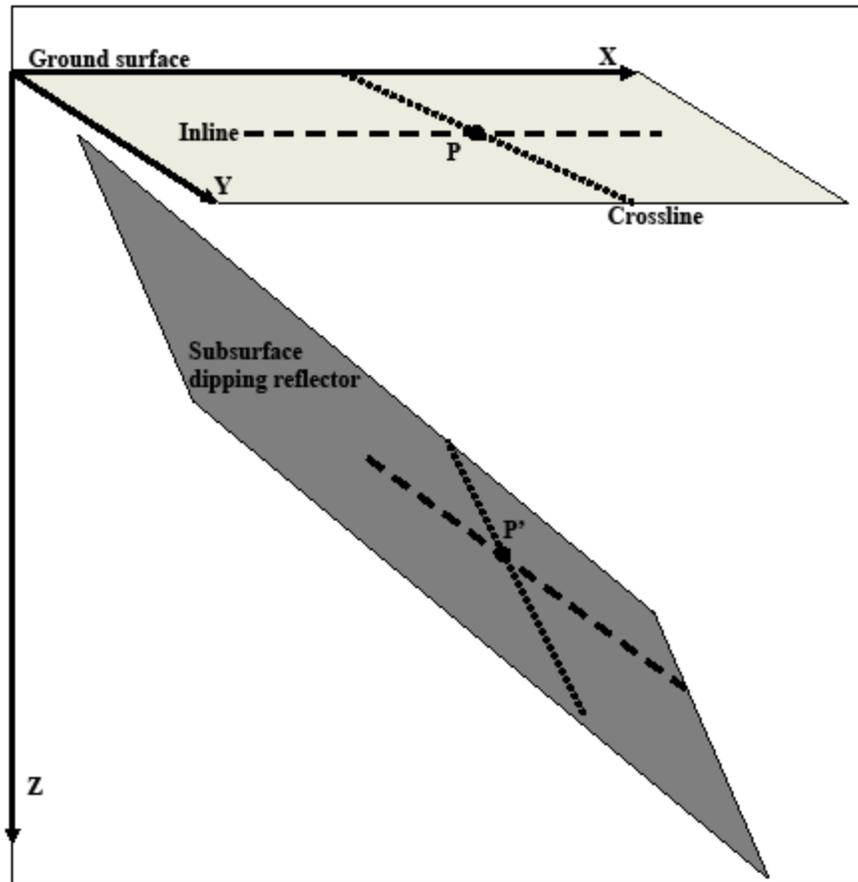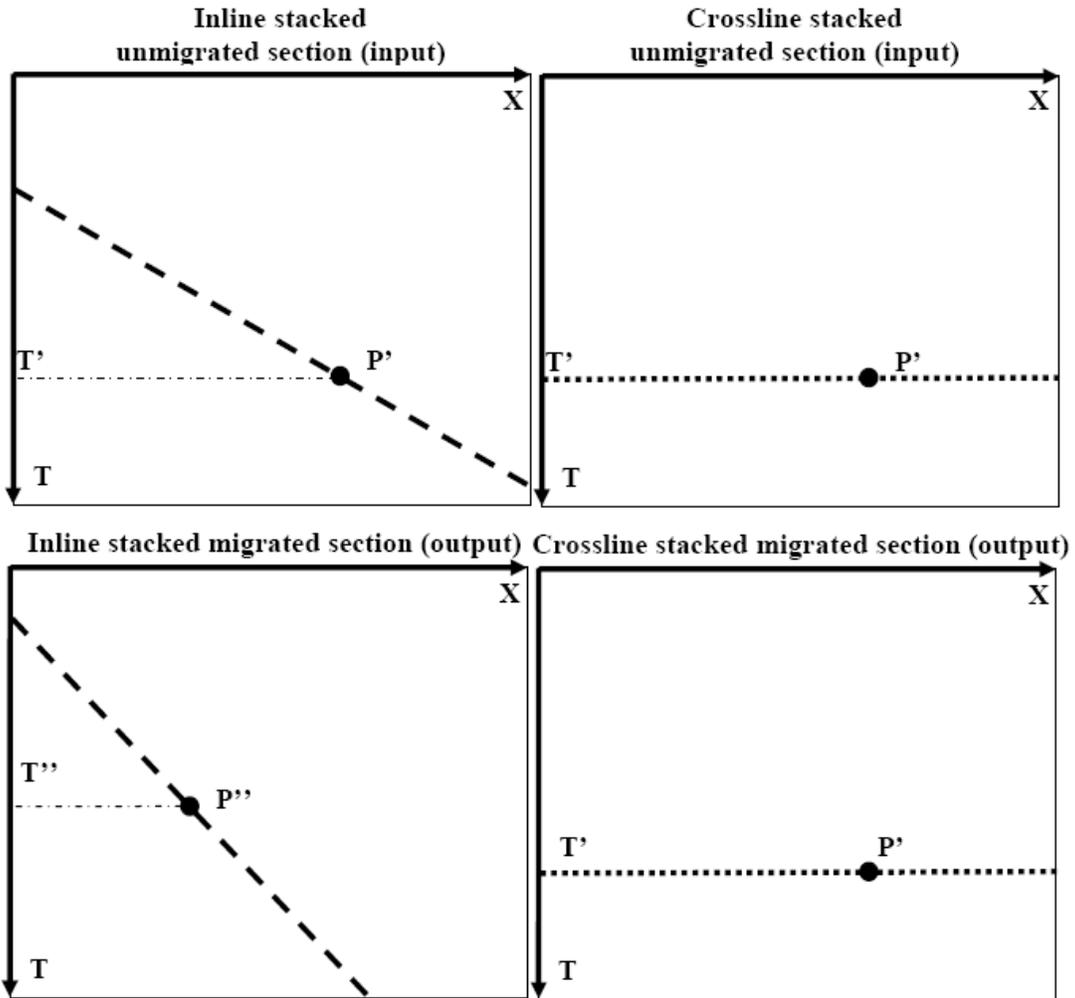T''   •P''

T

Crossline stacked migrated section (output)

X

T'   •P'

T

In 2-D migration, we migrate the inline and crossline separately. This causes the intersection point at depth (P') to have two different positions on the migrated sections generating a lateral and vertical mistie.
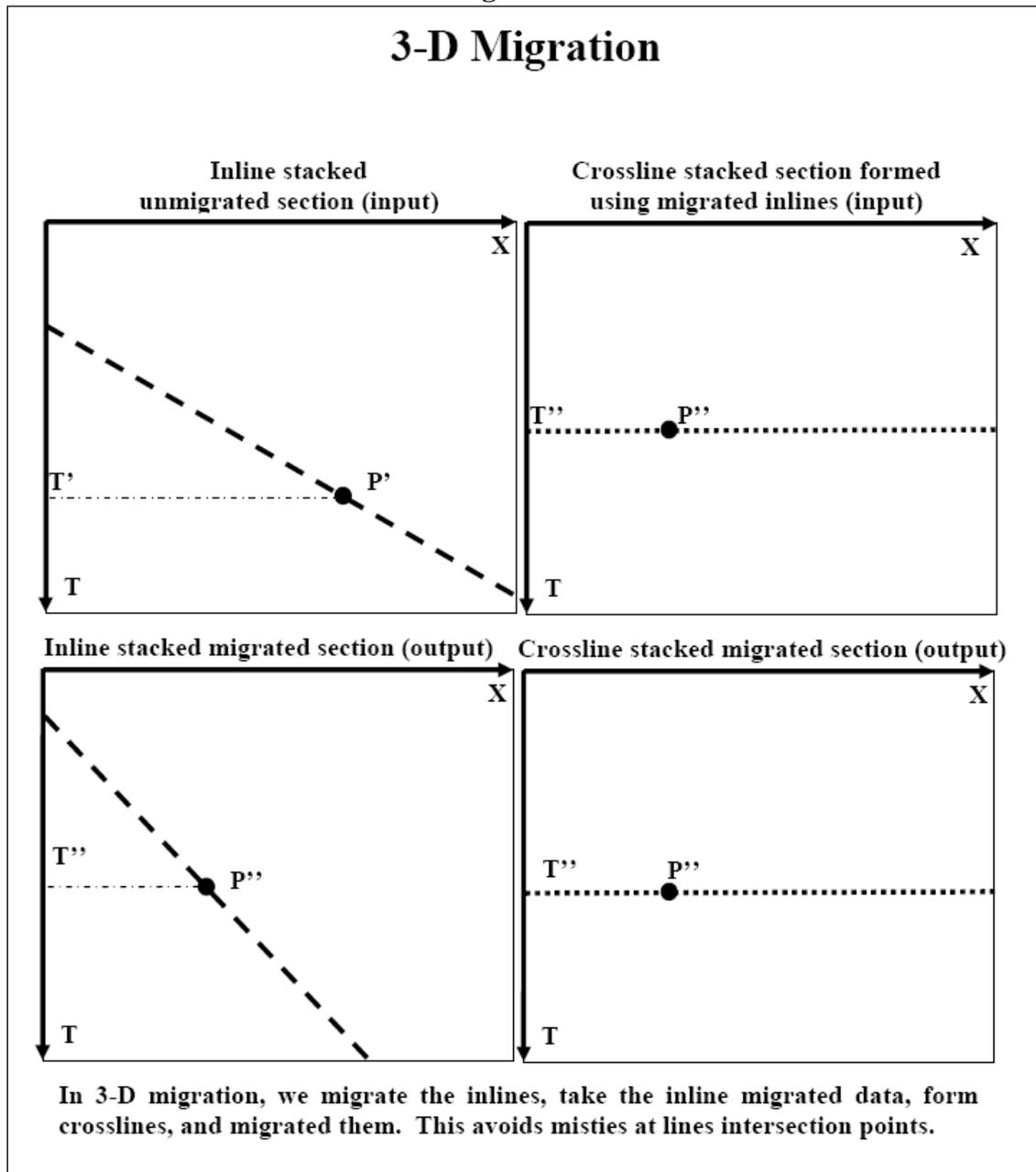
Figure 7.4c

3-D Migration

Inline stacked
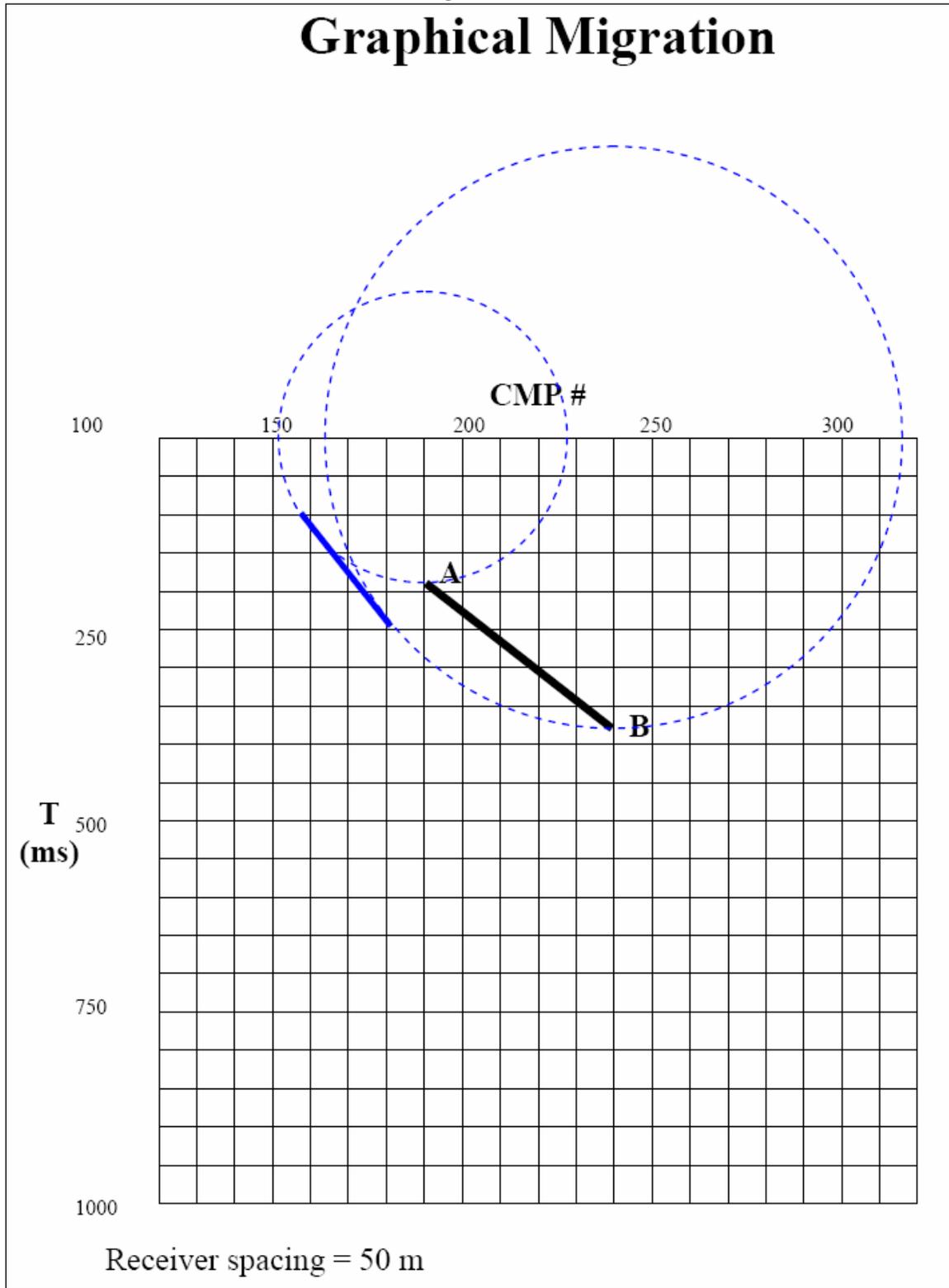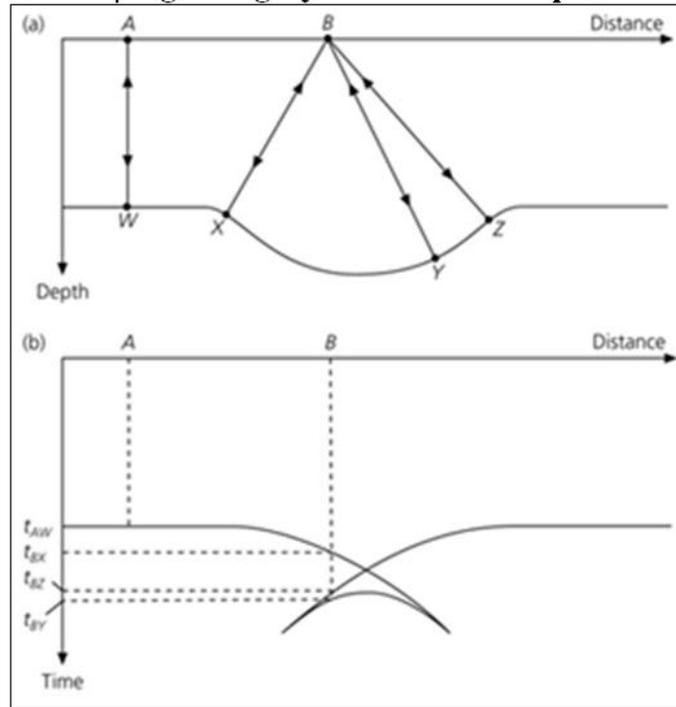**unmigrated section (input)**

Crossline stacked section formed
using migrated inlines (input)

X

X

T'   P'

T"   P"

T

T

Inline stacked migrated section (output)

Crossline stacked migrated section (output)

X

X

T"   P"

T"   P"

T

T

In 3-D migration, we migrate the inlines, take the inline migrated data, form
crosslines, and migrated them. This avoids misties at lines intersection points.

Figure 7.5

Graphical Migration

CMP #

T (ms)

Receiver spacing = 50 m

Figure 7.6

Migrating Synclines - Concept

(a) A · · · B ························· Distance

W X Y Z

Depth

(b) A B Distance

t_{AW}
t_{BX}
t_{BZ}
t_{BY}

Time
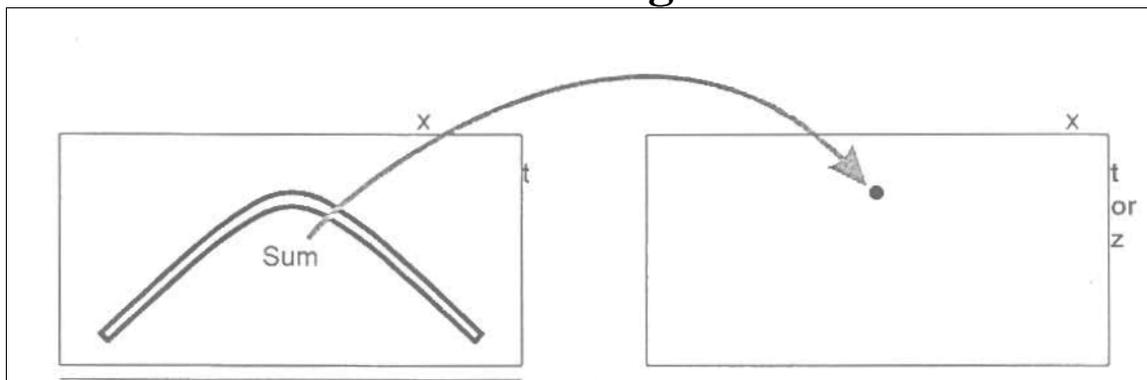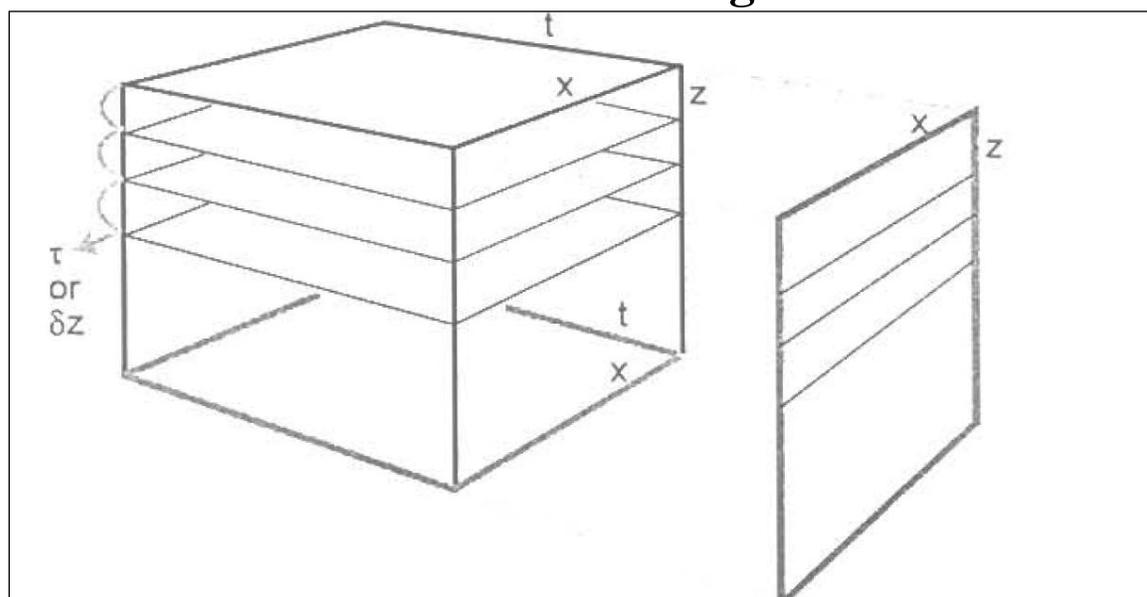
Example

(a) (b)
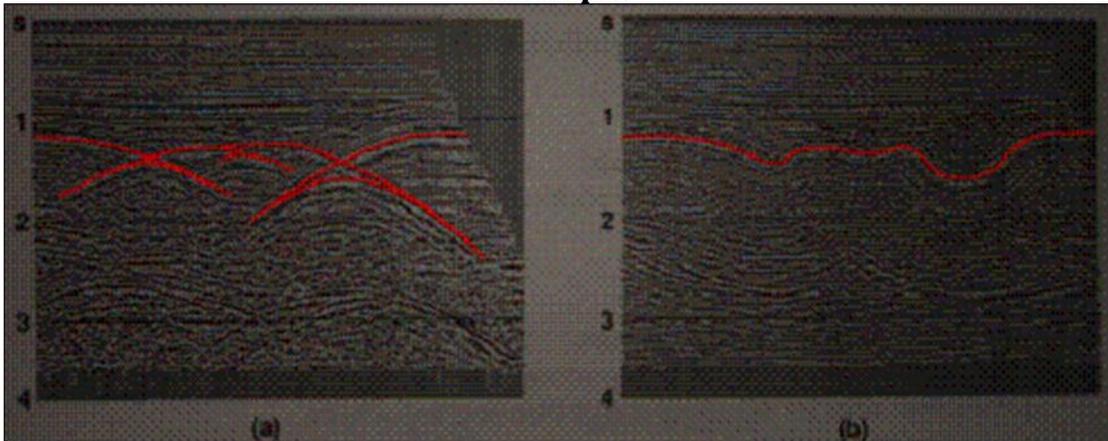
Figure 7.7
Kirchhoff Migration

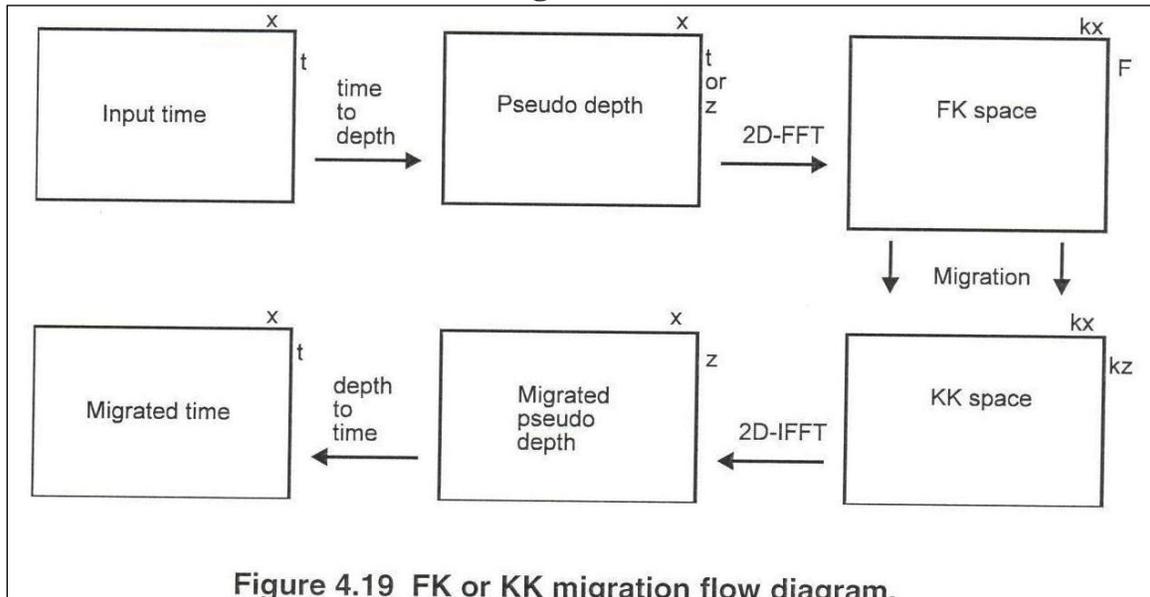## Figure 7.8
Finite-Difference Migration

Figure 7.9
FK migration flow

Figure 4.19 FK or KK migration flow diagram.

FK migration kernel

Figures 4.24. Illustration of movement on the FK and KK plane with a) showing dip model, b) the FK transform, c) the KK migrated data, and d) the resulting migration on the *(x, z)* plane.