

*

hamid@ut.ac.ir :

*

(// : // :)

(Spatial wavelet)

(Aperture)

(common shot gather)

(Migration noise)

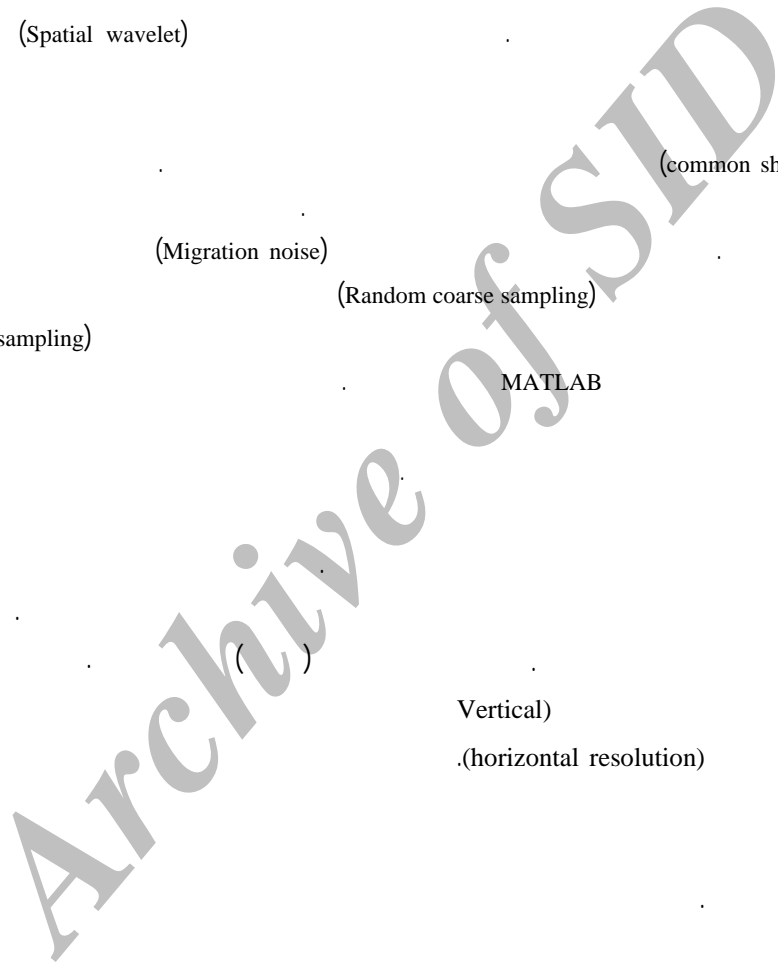
(Random coarse sampling)

Regular)

(Regular dense sampling)

(coarse sampling

MATLAB



()

Vertical)

(horizontal resolution)

(resolution

(Yilmaz 2001)

c(x)

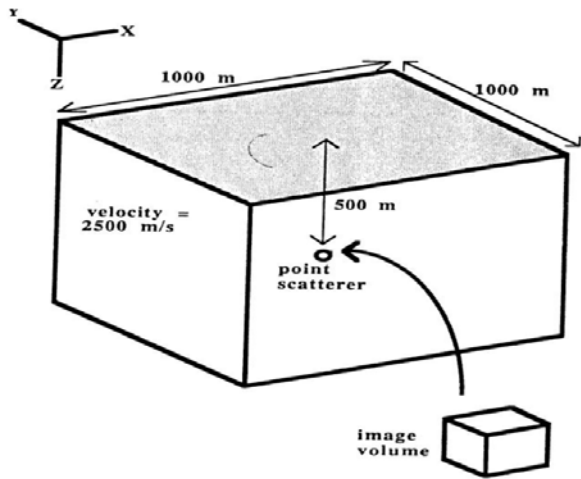
v(x)

(Bleistein et al. 2001)

$$\frac{1}{v^2(x)} = \frac{1}{c^2(x)} (1 + \alpha(x)) \quad ()$$

$\alpha(x)$

()



$$\alpha(x)$$

(1986) Cohen *et al.*

$$\alpha(x)$$

$$k = f \nabla_x \varphi(x, \xi) \quad (1)$$

k f

$$\varphi(x, \xi)$$

$$\varphi(x, \xi) = \tau(x, x_s) + \tau(x, x_r) = \tau_s + \tau_r \quad (2)$$

R S D
RD SD
 $\theta = (\theta_s + \theta_r)/2$
 $k_i = (\theta_s - \theta_r)/2$

$$\tau(x, y)$$

x x

c(x) α
r s

$$k = k_s + k_r \quad (3)$$

$\xi_2 \xi_1$ p

$$k_r k_s()$$

$\tau()$ x
a ()

τ_s

x

$k_r k_s$ (Vermeer 1999)

$$a(s, r) = A(s, x) A(x, r) \quad (4)$$

()

A(x, r) A(s, x)

k

(Vermeer 1998)

x x
x h

()

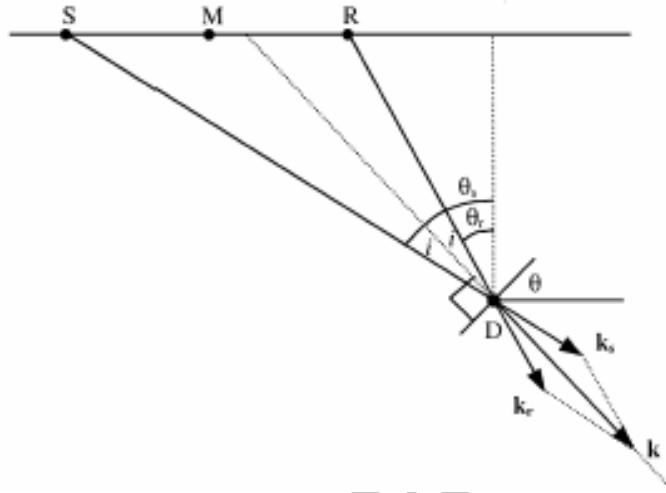
(1985) Beylkin

$\alpha(x)$ (1986) Cohen *et al.*

(Von Seggern 1994)

$$\alpha(x) = \frac{c^2(x)}{8} \iint d\xi_1 d\xi_2 \frac{h \cdot p[s, r, t = \tau(s, r)]}{a(s, r)} \quad (5)$$

$$h(x, \xi) = \begin{vmatrix} \frac{\partial \varphi}{\partial x_1} & \frac{\partial \varphi}{\partial x_2} & \frac{\partial \varphi}{\partial x_3} \\ \frac{\partial^2 \varphi}{\partial x_1 \partial \xi_1} & \frac{\partial^2 \varphi}{\partial x_2 \partial \xi_1} & \frac{\partial^2 \varphi}{\partial x_3 \partial \xi_1} \\ \frac{\partial^2 \varphi}{\partial x_1 \partial \xi_2} & \frac{\partial^2 \varphi}{\partial x_2 \partial \xi_2} & \frac{\partial^2 \varphi}{\partial x_3 \partial \xi_2} \end{vmatrix} \quad ()$$



$$f_p \sin \theta_{x, \max} = \omega \sin \theta_r \sin \theta_s \quad ()$$

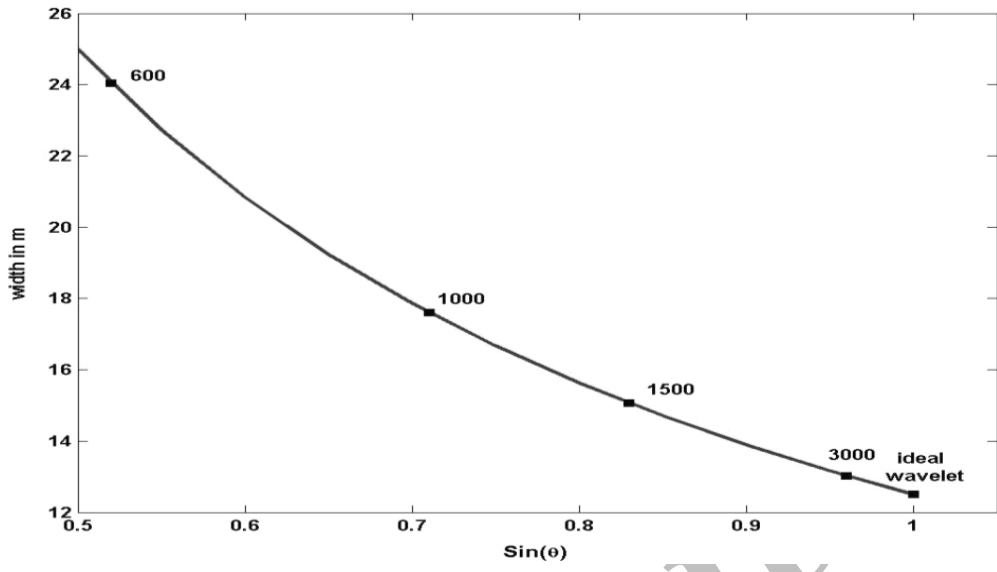
Archive

$$\omega = \frac{v}{4 f_p \sin \theta_{x, \max}} \quad ()$$

:(Vermeer 1999)

$$\omega = \frac{v}{2 f_p (\sin \theta_s + \sin \theta_r)} \quad ()$$

()



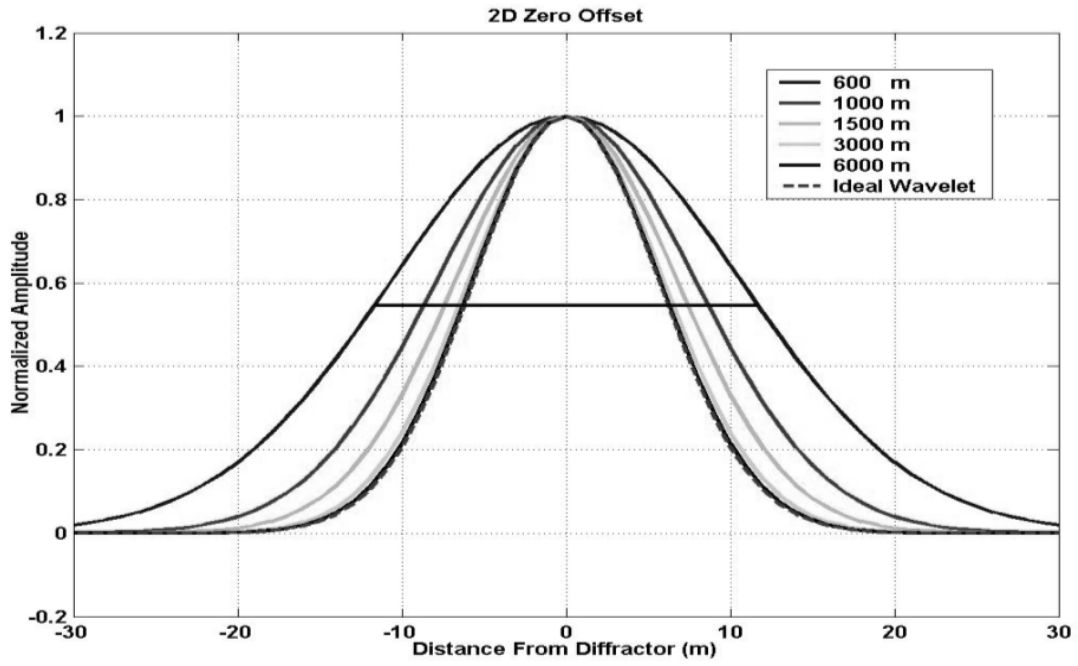
Archive of SID

()

()

x

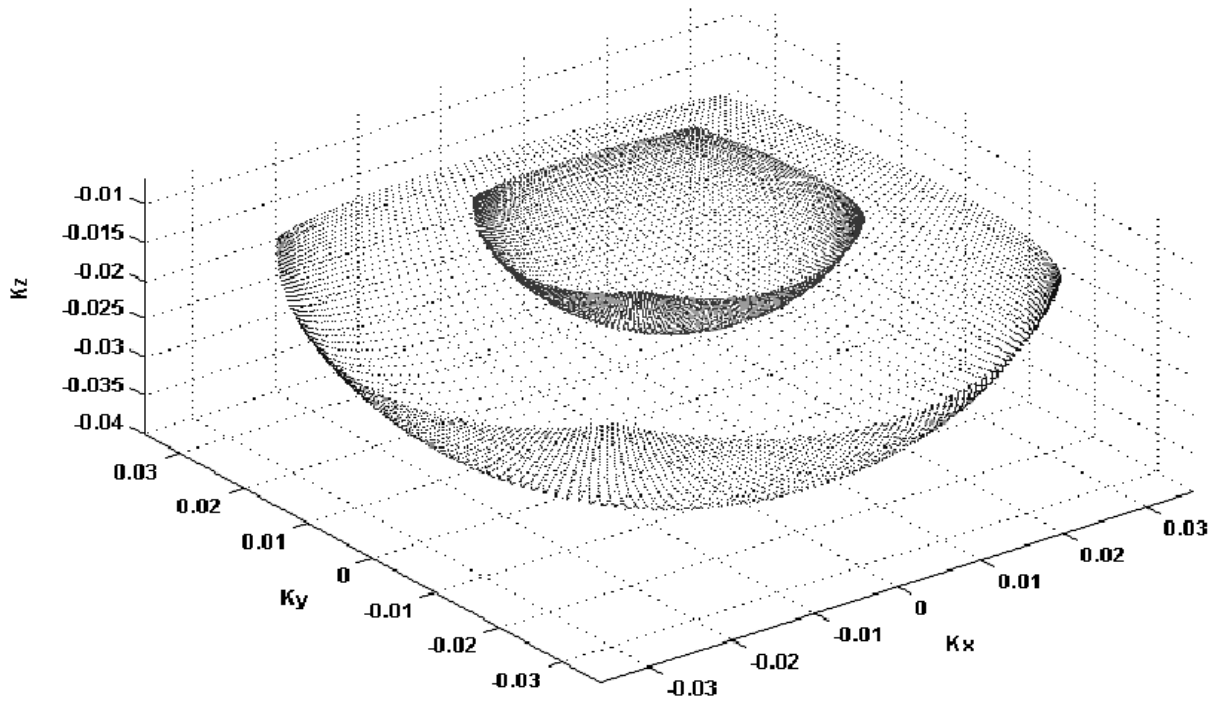
(1985)Safar



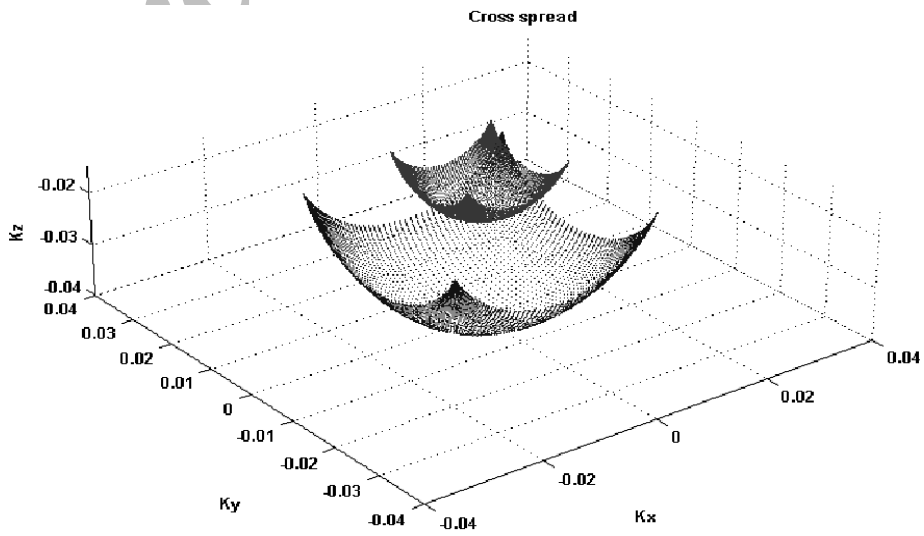
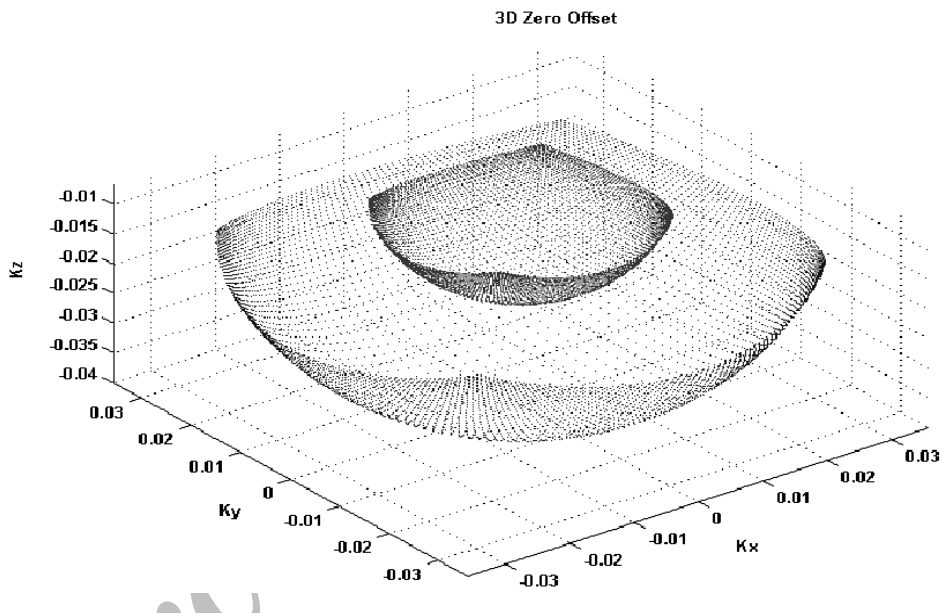
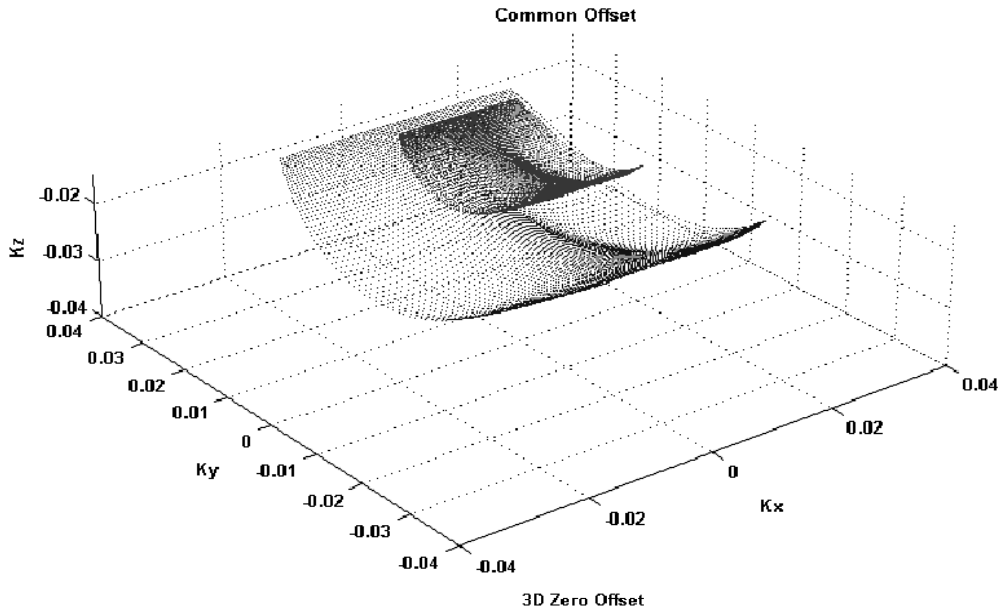
θ
()

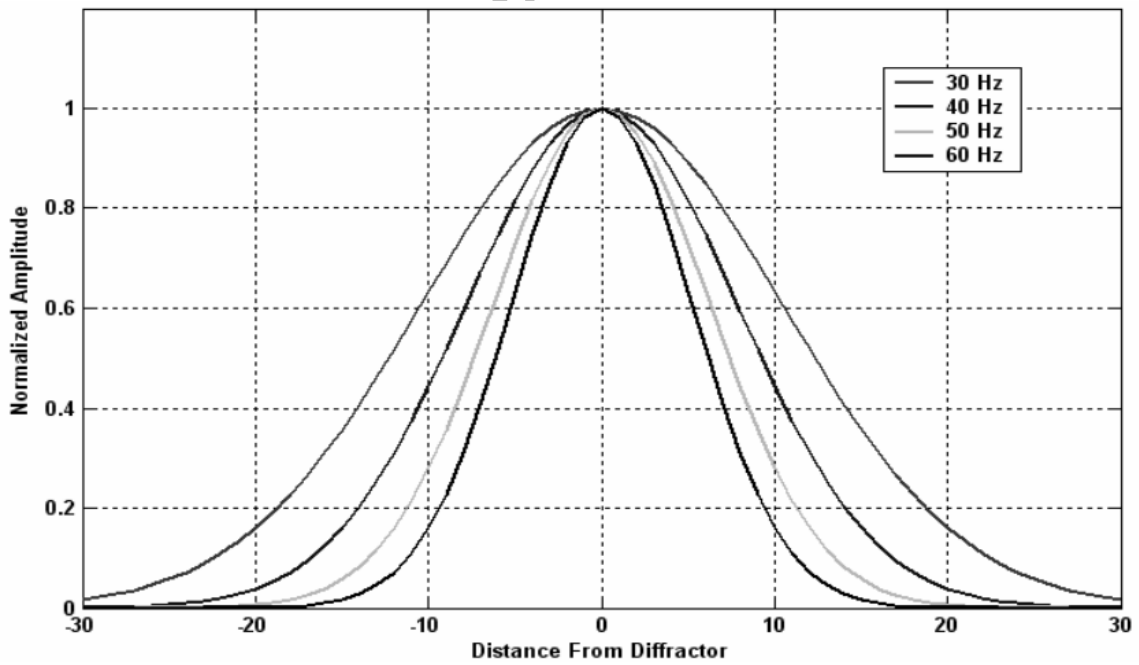
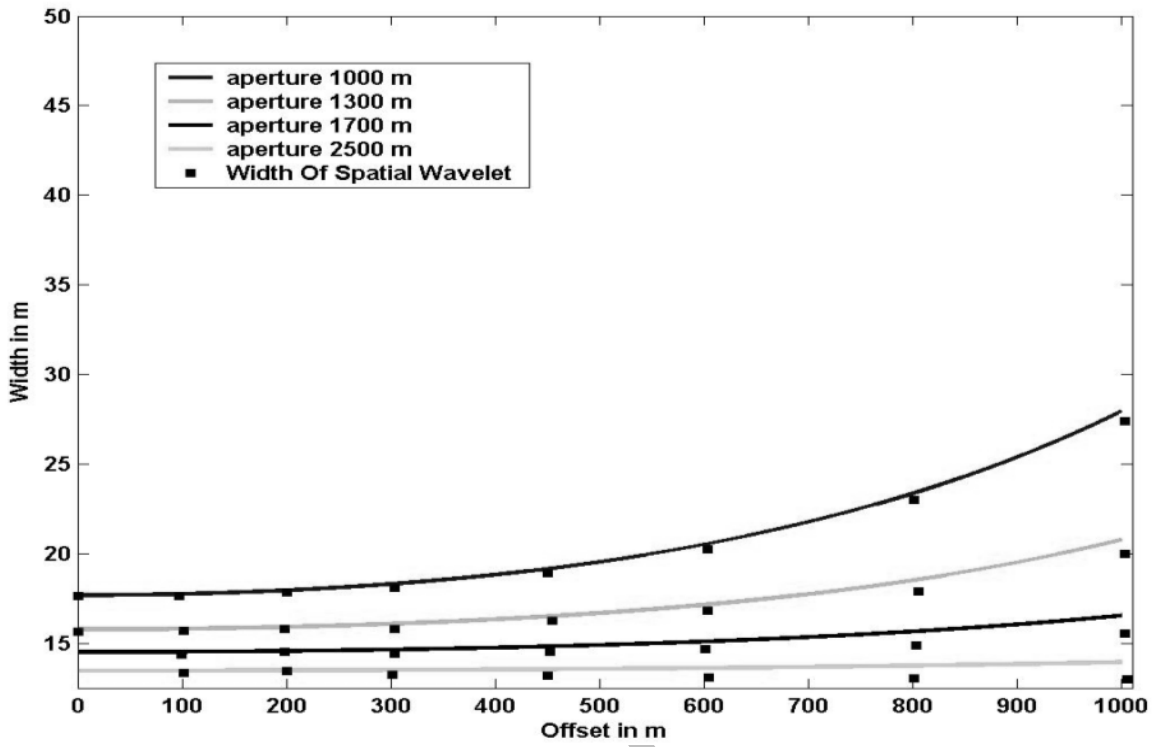
Sin θ

3D Zero Offset

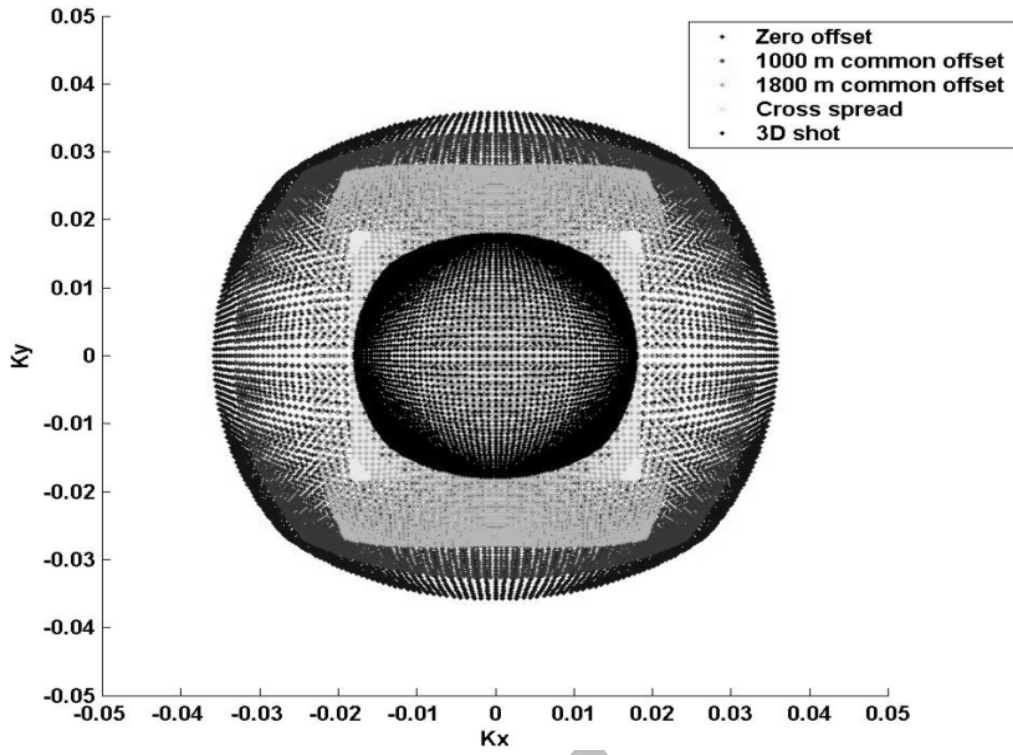


()





()



Archive 01

(Yilmaz 2001)

()

()

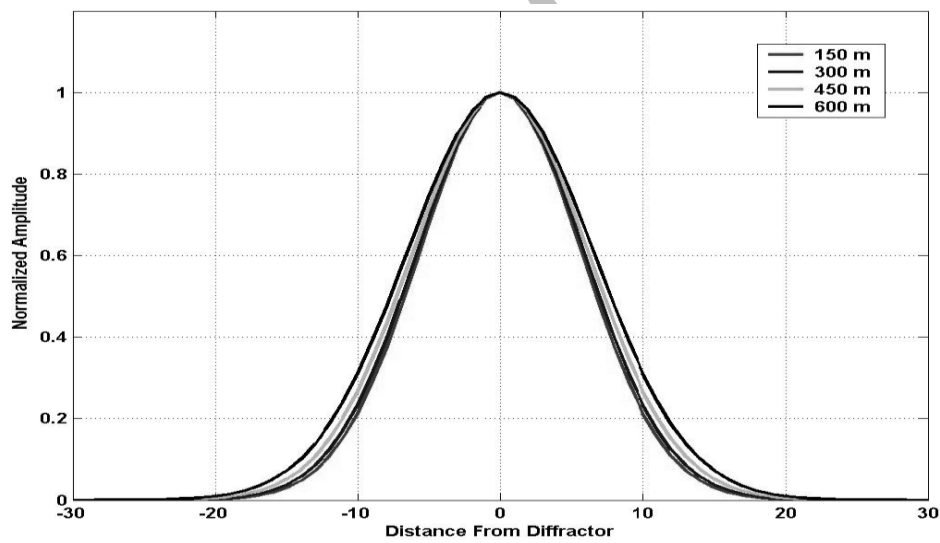
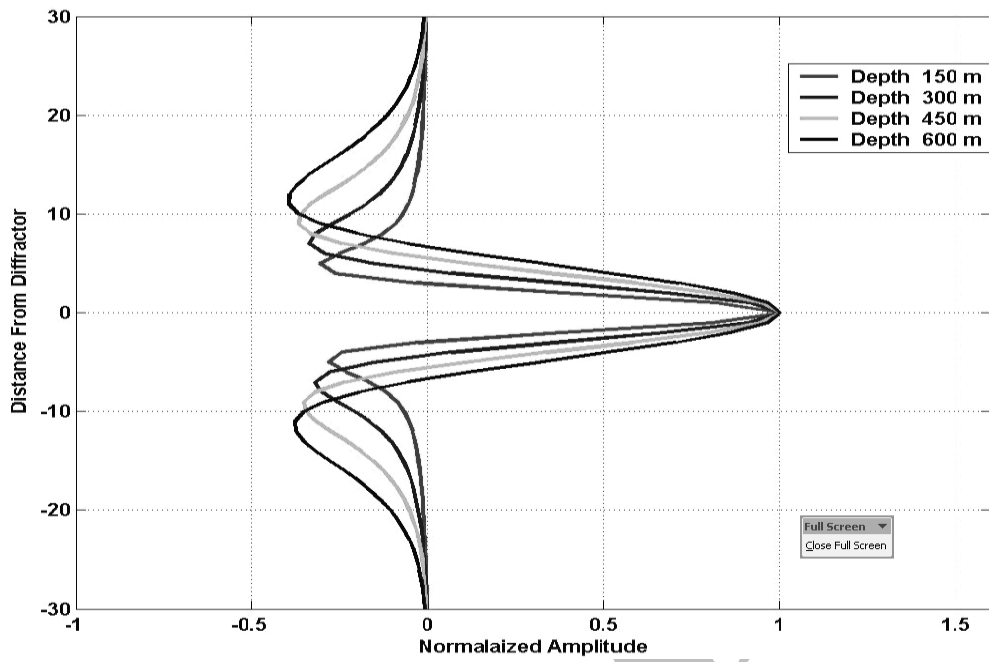
)

(

(

)

()



ξ

$$\xi \quad \varphi(x, \xi) - \varphi(d, \xi) \quad)$$

(

)

()

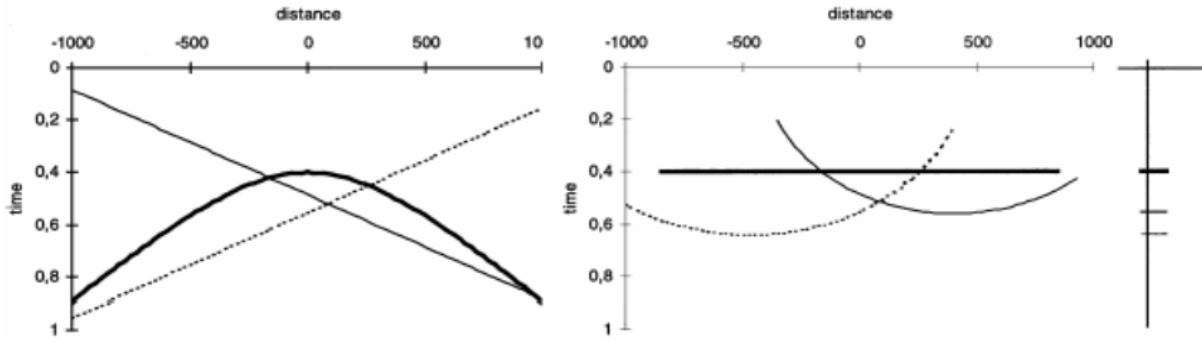
(

(Vermeer 1999)

" "

()

()



()

/

$k=0$

()

$k = 1/d$

$k = 1/(2d)$

dB

$k=0$

()

)

()

(

/

/

()

/

()

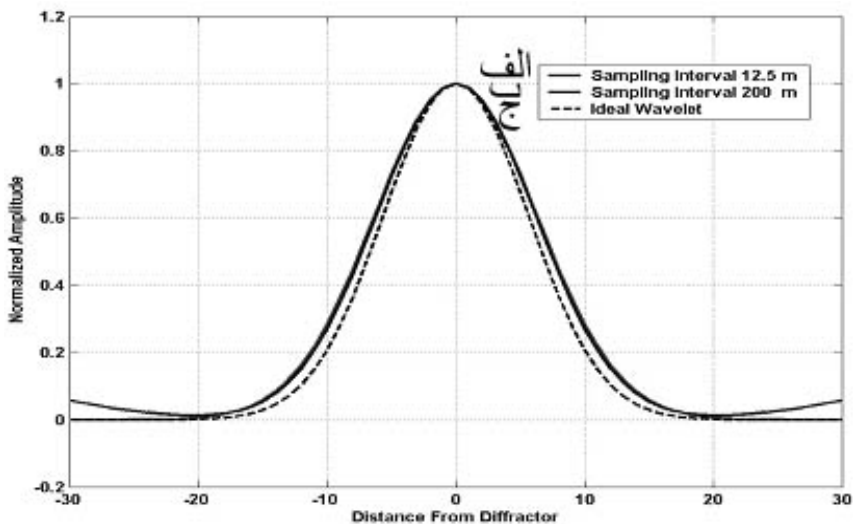
$k = 1/d$

d

$k_N = 1/(2d)$

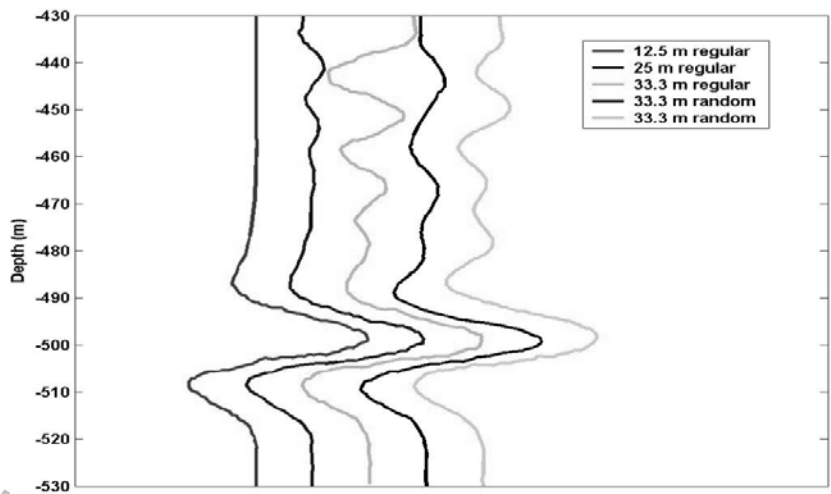
$k = 1/d$

(d)



()
()

()
 $x = 0$



)

($k = 0.02$)

)

($k = 0.04$)

(
rejection

N

.(Vermeer 1998)

" "

(1985)

N

(temporal coordinate)

(spatial coordinate)

N

()

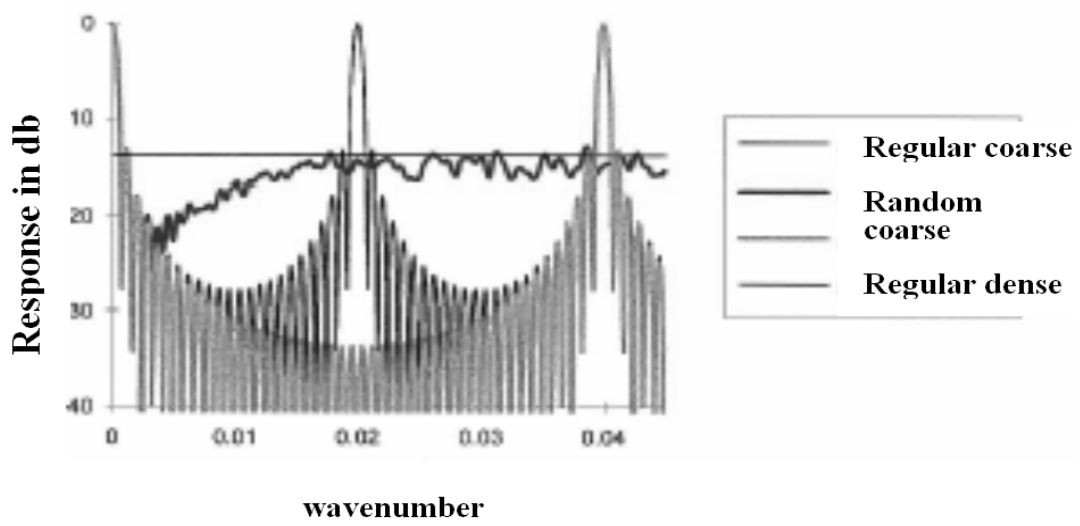
N

(

N

N

(undersampled)



/ :

(

wavenumber

)

(

/

/

(1996) Markley *et al.*

(

)

(

)

Archive

(1999) Vermeer

(Kallweit & Wood 1982)

(

)

-
- Beylkin G. 1985: Imaging of discontinuities in the inverse scattering problem by inversion of a causal generalized Radon transform. *J. Math. Phys.* **26**: 99–108.
- Beylkin G., Oristaglio M., and Miller D. 1985: Spatial resolution of migration algorithms. In Berkhout, A. J., Ridder, J., van der Waals, L. F. (eds.), Proc. 14th Internat. Symp. on Acoust. Imag. Pp. 155-167.
- Bleistein N., Cohen J. K., Stockwell J. W. 2001: Mathematics of multidimensional seismic imaging, migration and inversion. Springer-Verlag.
- Cohen J. K., Hagin F. G., Bleistein N. 1986: Three-dimensional Born inversion with an arbitrary reference. *Geophysics* **51**: 1552-1558.
- Kallweit R. S., Wood L. C. 1982: The limits of resolution of zero-phase wavelets. *Geophysics* **47**: 1035-1046.
- Markley S. A., Ebrom D. A., Sekharan K. K., McDonald J. A. 1996: The effect of fold on horizontal resolution in a physical model experiment. 66th Ann. Internat. Mtg. Soc. Expl. Geophys., Expanded Abstracts, ACQ2.2.
- Safar M. H. 1985: On the lateral resolution achieved by Kirchhoff migration. *Geophysics* **50**: 1091–1099.
- Vermeer G. J. O. 1998: 3-D symmetric sampling. *Geophysics* **63**: 1629-1647.
- Vermeer G. J. O. 1999: Factors affecting spatial resolution. *Geophysics* **64**: 942-953.
- Von Seggern D. 1994: Depth-imaging resolution of 3-D seismic recording patterns. *Geophysics* **59**: 564-576.
- Yilmaz O. 2001: Seismic Data Analysis. Society of Exploration Geophysicists, Tulsa, Oklahoma, USA.