Table S1 lists the seismic stations used in this study. We report station coordinates (latitude and longitude), elevation and recording time window. The last column indicates whether the station was selected for harmonic stripping or not (see details in section 3).

Table S1. List of stations with coordinates, elevation, recording time window, and selection

Station	Latitude °N	Longitude °E	Elevation (m)	Recording time window	Selection
RSISNE (Broadband Stations)					
nban	-9.669	-36.275	261	29/09/2011 - 25/11/2013	yes
nbca	-8.226	-36.013	616	09/04/2012 - 22/04/2013	no
nbcl	-4.224	-38.291	020	26/05/2011 - 28/12/2013	yes
nbcp	-12.589	-39.181	222	27/09/2011 - 30/04/2013	yes
nbit	-14.931	-39.434	178	13/10/2011 - 25/11/2013	yes
nbla	-10.993	-37.789	217	03/09/2011 - 25/11/2013	yes
nbli	-7.364	-36.950	613	18/07/2011 - 25/11/2013	yes
nbma	-7.365	-38.764	437	06/07/2011 - 25/11/2013	yes
nbmo	-3.311	-40.041	098	29/12/2010 - 28/12/2012	yes
nbpa	-5.750	-37.112	091	12/04/2011 - 25/11/2013	yes
nbpb	-5.543	-39.584	260	29/05/2011 - 28/12/2013	yes
nbpn	-10.847	-40.199	387	05/04/2011 - 25/11/2013	yes
nbps	-4.394	-41.446	719	24/09/2011 - 25/11/2013	yes
nbpv	-6.418	-35.291	092	30/04/2011 - 25/11/2013	yes
nbrf	-8.679	-35.127	061	02/08/2011 - 25/11/2013	yes
nbta	-9.122	-38.063	344	27/07/2011 - 25/11/2013	yes
nbjg	-5.5932	-38.3947	119	17/07/2013 - 25/11/2013	no
nbpe	-9.2465	-40.6804	450	12/08/2013 - 16/11/2013	no
nbpi	-7.083	-41.3699	247	12/08/2013 - 24/10/2013	no
INCT-ET					
Broadband Stations					
lp01	-3.167	-40.926	067	20/03/2012 - 06/02/2013	no
lp02	-4.513	-39.635	688	20/03/2012 - 06/02/2013	yes
lp03	-5.0056	-38.9935	234	2012.073 to 2013.030	no
lp04	-5.590	-38.386	138	28/05/2012 - 05/02/2013	no
lp05	-6.678	-37.546	248	04/02/2012 - 05/02/2013	no
lp06	-7.747	-36.315	522	25/03/2012 - 28/02/2013	yes
lp07	-8.227	-35.6401	531	25/03/2012 - 28/02/2013	no
Short-period Stations					
km60	-5.219	-37.876	141	03/10/2011 - 13/08/2012	yes
pcac	-6.475	-36.62	293	28/09/2011 - 24/04/2013	no

pcal	-7.569	-35.233	098	05/12/2011 - 23/04/2013	yes
pcbs	-7.747	-36.315	522	23/11/2011 - 19/03/2013	no
pccc	-6.026	-36.342	614	15/08/2012 - 13/04/2013	no
pccg	-7.305	-35.772	409	15/09/2011 - 24/04/2013	no
pcgr	-8.228	-35.640	522	22/11/2011 - 19/03/2013	no
pcgu	-7.906	-37.377	657	16/08/2012 - 16/05/2013	no
pcja	-6.463	-35.958	310	04/10/2011 - 24/04/2013	yes
pcjg	-5.593	-38.395	134	03/11/2011 - 19/03/2013	no
pcma	-5.181	-36.603	160	06/10/2011 - 07/06/2012	no
pcmn	-6.828	-35.114	036	25/11/2011 - 19/03/2013	no
pcpi	-5.976	-35.235	064	23/10/2011 - 14/08/2012	no
pcqp	-8.817	-36.037	549	15/08/2012 - 16/05/2013	no
pcsa	-8.351	-36.551	694	19/10/2011 - 24/04/2013	yes
pcse	-8.326	-37.473	482	07/12/2011 - 24/04/2013	yes
pcsl	-7.008	-36.381	596	06/12/2011 - 23/04/2013	yes
pcso	-8.957	-36.702	858	16/08/2012 - 16/05/2013	no
pcst	-8.199	-38.431	419	17/08/2012 - 16/05/2013	no
pctu	-8.785	-37.341	746	16/08/2012 - 16/05/2013	no
pctv	-7.646	-37.860	746	07/12/2011 - 25/04/2013	yes
pcvs	-6.679	-37.546	210	29/09/2011 - 25/03/2012	no
Milênio (Broadband Stations					
agbr	-8.4295	-35.9361	489	05/04/2007 - 01/03/2008	no
ocbr	-4.5813	-38.392	076	16/08/2007 - 04/07/2009	yes
pfbr	-6.1216	-38.271	120	26/08/2007 - 22/02/2013	yes
sabr	-8.3511	-36.550	681	17/04/2009 - 03/09/2011	yes
sbbr	-3.7451	-40.371	056	22/07/2007 - 07/06/2013	yes
slbr	-6.7815	-35.744	544	22/09/2007 - 16/10/2008	no
GSN (Broadband Station					
rcbr	-5.8274	-35.901	420	20/08/2007 - 30/12/2013	yes
BLSP (Broadband Stations					
agbl	-9.038	-37.045	448	07/02/2002 - 30/11/2004	no
caub	-8.176	-36.010	490	07/02/2002 - 30/11/2004	yes
crtb	-13.4321	-44.5819	541	22/12/2003 - 29/04/2004	no
cs6b	-5.4945	-38.6709	110	19/05/2003 - 15/06/2005	yes

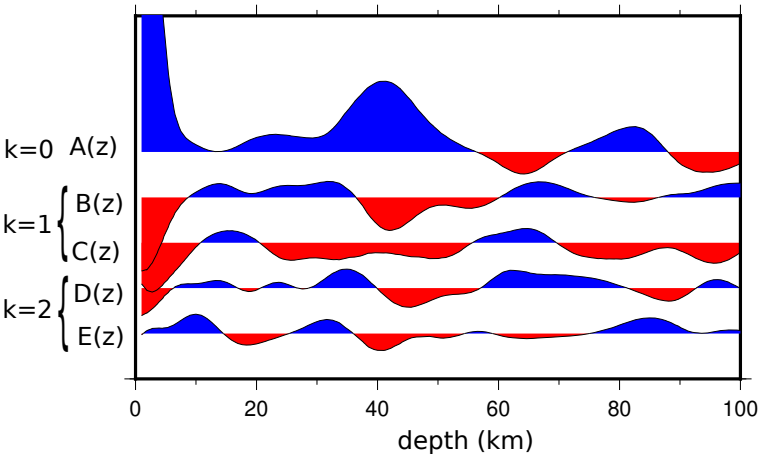
itpb	-15.9887	-39.6282	307	12/10/2002 - 03/05/2004	yes
pdcb	-12.5306	-39.1238	220	24/09/2002 - 25/02/2004	yes
trsb	-4.873	-42.7059	125	12/10/2002 - 03/05/2004	yes
Bodes (Broadband Stations					
ar01	-6.1682	-39.4098	305	11/02/2015 - 22/02/2016	yes
ar02	-6.6419	-39.3402	341	02/02/2015 - 18/02/2017	yes
ar03	-7.0466	-39.4958	479	02/02/2015 - 07/06/2016	no
ar04	-7.5758	-39.6746	493	07/01/2015 - 18/02/2017	yes
ar05	-8.0932	-39.8983	441	02/02/2015 - 18/02/2017	yes
ar06	-8.6305	-40.2249	454	02/02/2015 - 24/08/2016	yes
ar07	-9.6154	-40.3837	405	02/02/2015 - 25/12/2016	yes
ar08	-9.1450	-40.3727	394	13/02/2015 - 21/08/2016	no
ar09	-10.2136	-40.1954	678	07/06/2016 - 24/04/2017	yes
ar50	-7.2079	-39.5494	920	19/09/2015 - 21/06/2016	no
ar51	-7.3879	-39.6314	933	11/06/2015 - 11/06/2015	no
Others (Broadband Stations)					
jcbe	-5.446	-35.775	114	28/10/2011 - 14/11/2012	no
pcsc	-8.35	-36.191	582	27/08/2012 - 14/12/2012	no

Figure S1 displays harmonic stripping results for each station. The five coefficient functions (A(z), B(z), C(z), D(z) and E(z)) - obtained by solving equation 1 - are represented in the upper part of the figure. The lower part represents the energy functions for the k=1 and k=2 harmonic degrees (see section 3). Note that, for most stations, energy on the k=1 and k=2 harmonic degrees are of comparable strength.

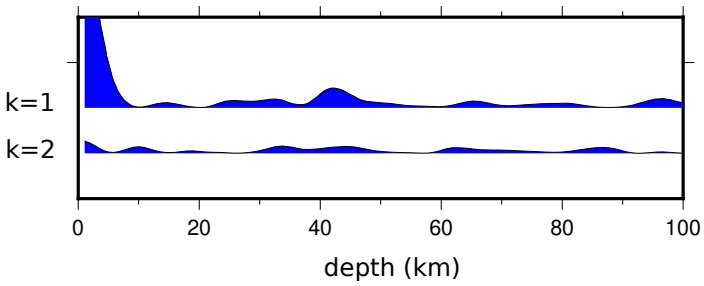
Figure S2 displays the k=1 and k=2 energy functions (see section 3) obtained for a synthetic receiver function test. We present 4 velocity models consisting of 3 layers with constant Vp and Vs. Layer 2 (in the middle) is characterized by anisotropy with an horizontal (first case - 0°) or dipping (following cases - 10°, 15°, 20°) fast axis of symmetry. Note that, for a horizontal axis of symmetry, the energy is entirely on the k=2 harmonic and that, when increasing the dip of the axis of symmetry, more energy becomes visible on the k=1 degree. For a slightly dipping axis of symmetry (10-to-15°), energy on both k=1 and k=2 degrees are of similar strength. And for a 20° dip, energy is dominant on the k=1 harmonic.

AR01

harmonics

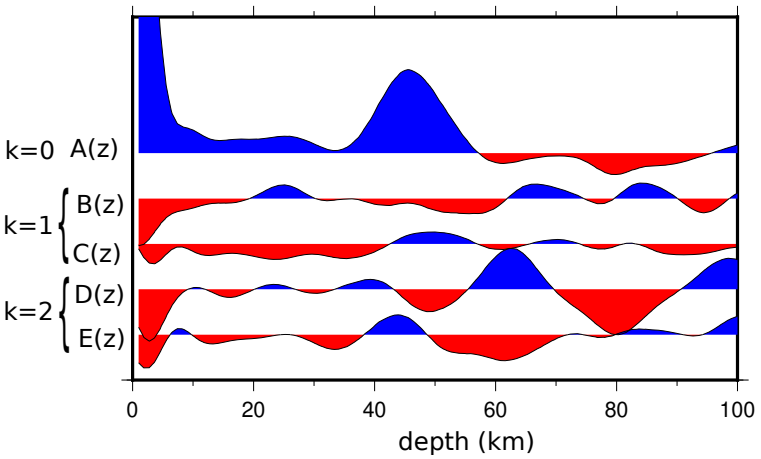


energy

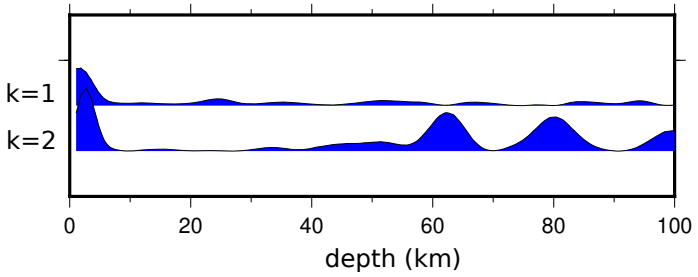


AR02

harmonics

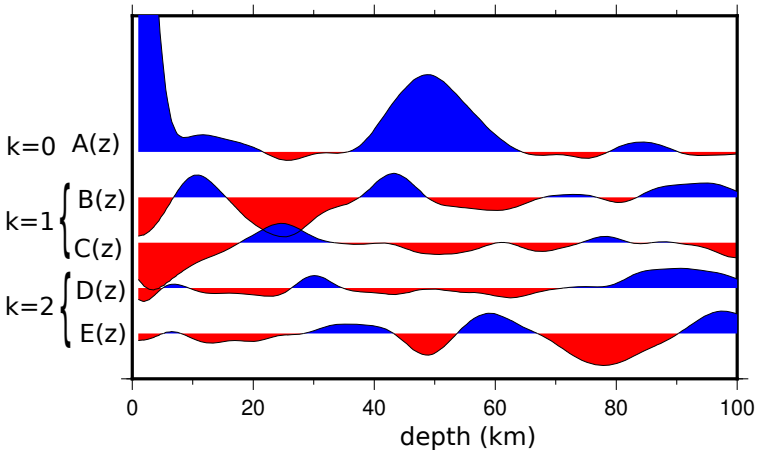


energy

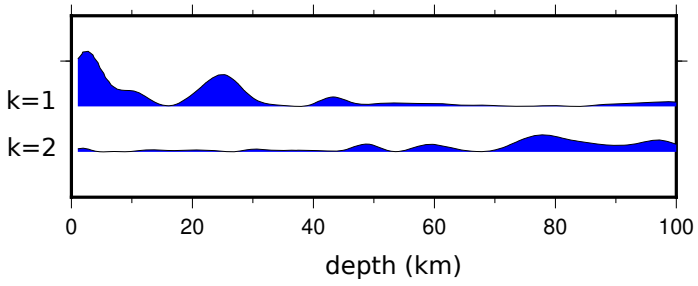


AR04

harmonics

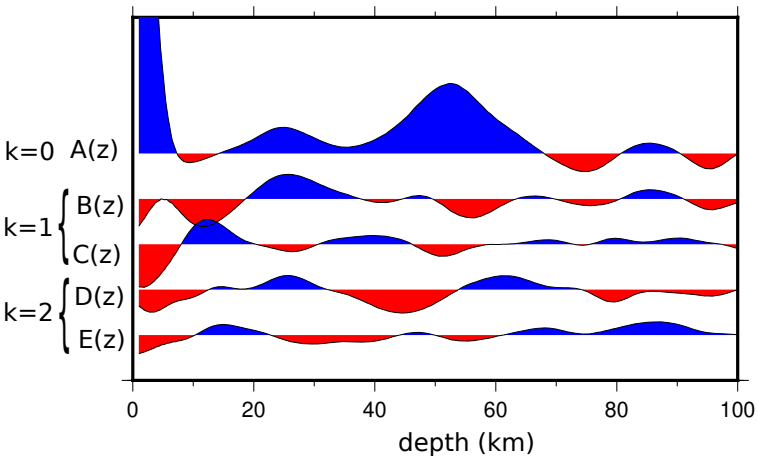


energy

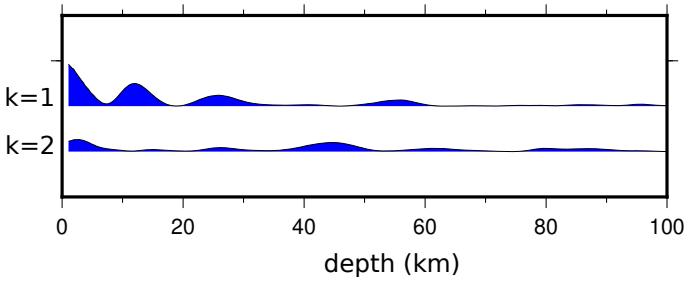


AR05

harmonics



energy



AR06

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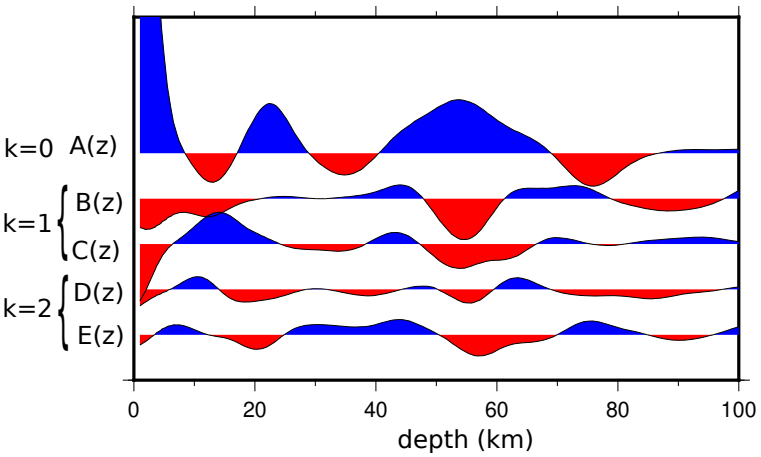
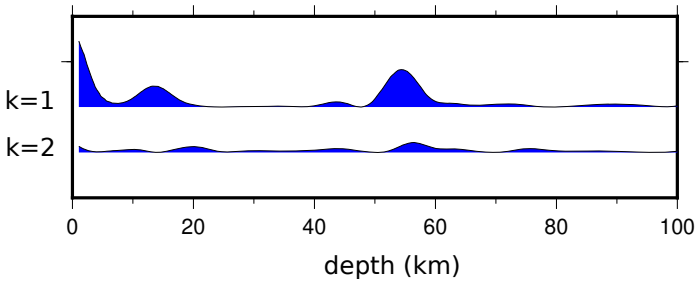


energy



AR07

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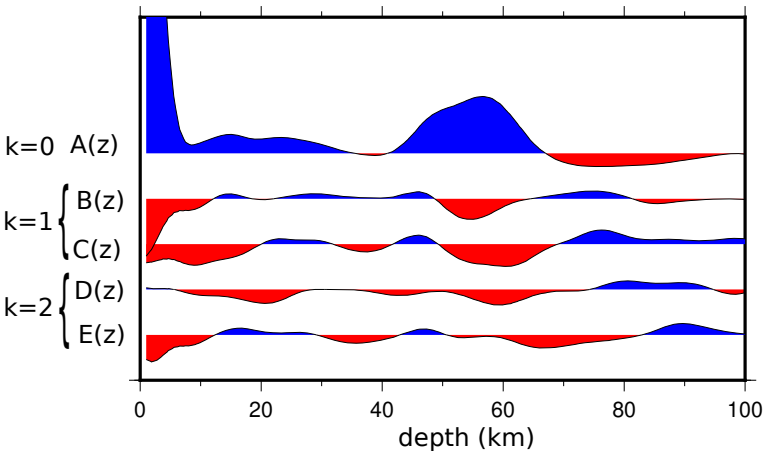
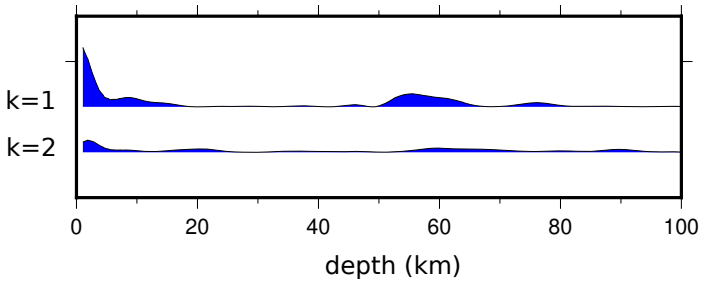
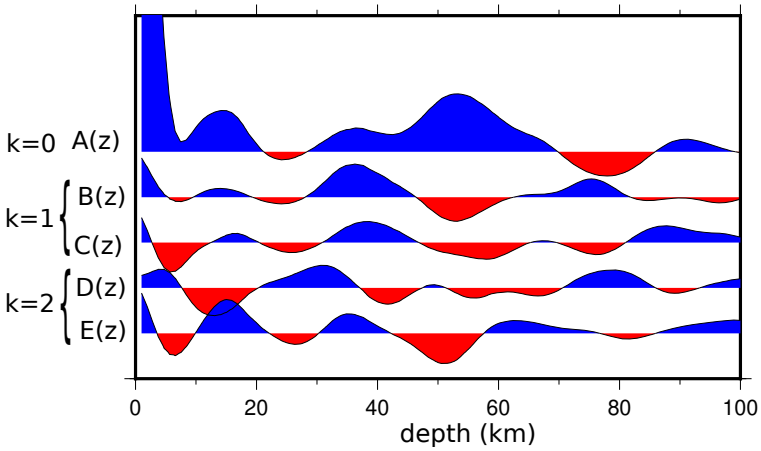


energy

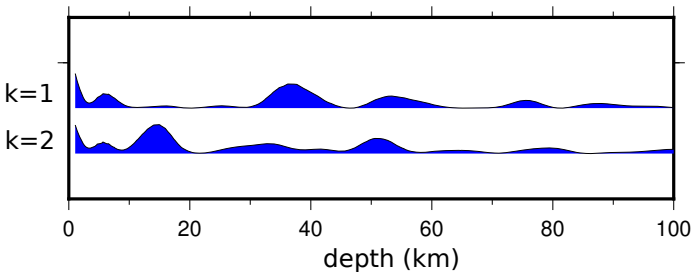


AR09

harmonics

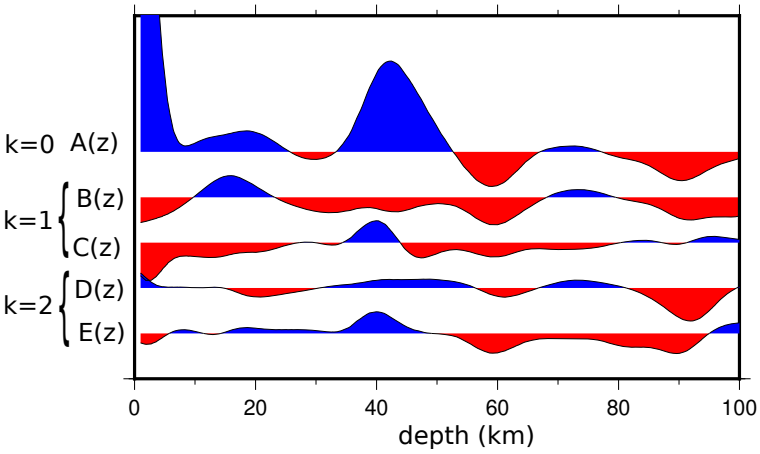


energy

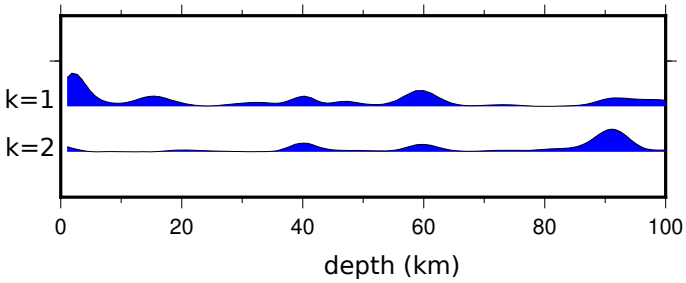


CAUB

harmonics

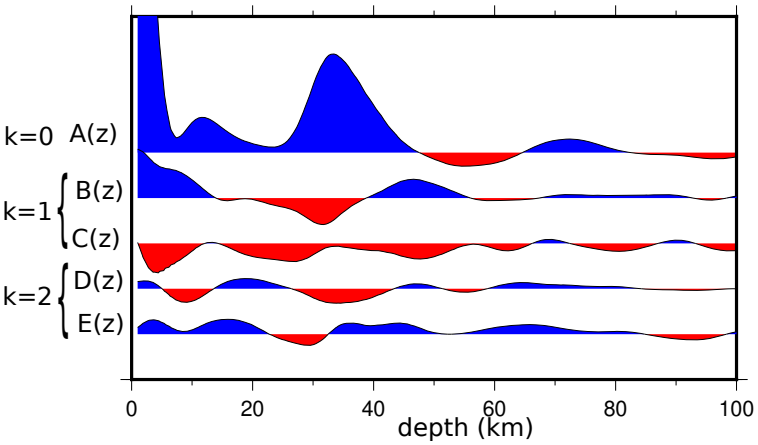


energy

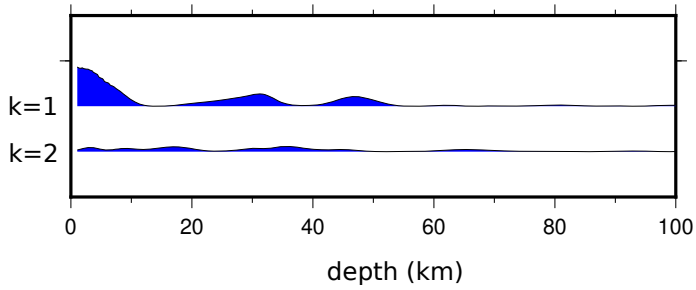


CS6B

harmonics

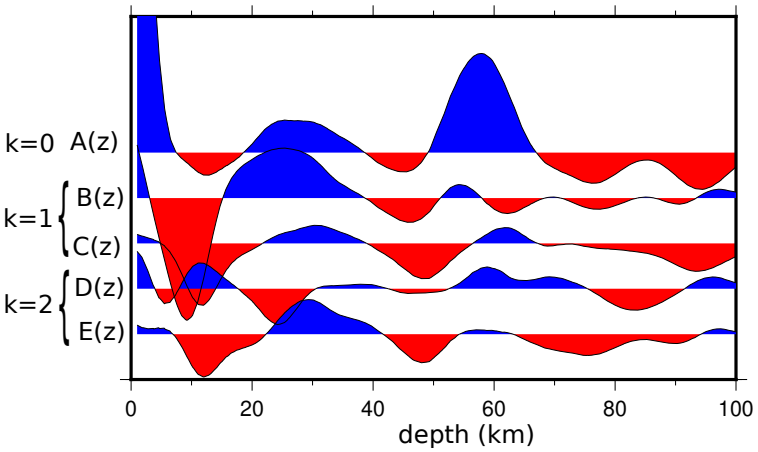


energy

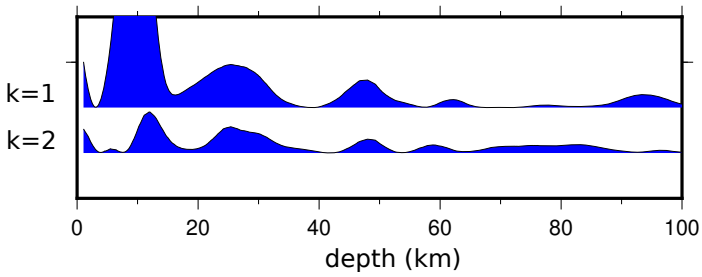


ITPB

harmonics

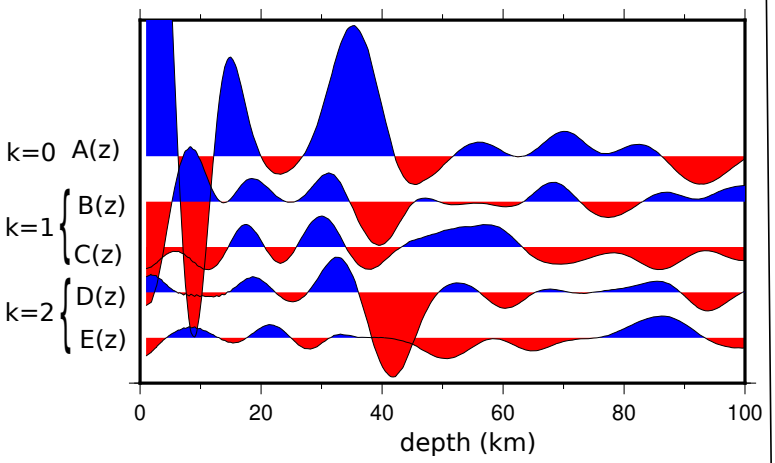


energy

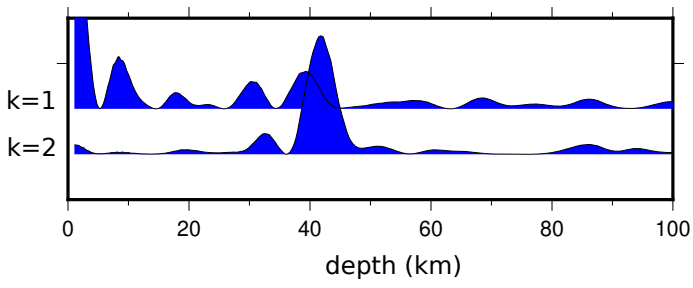


KM60

harmonics

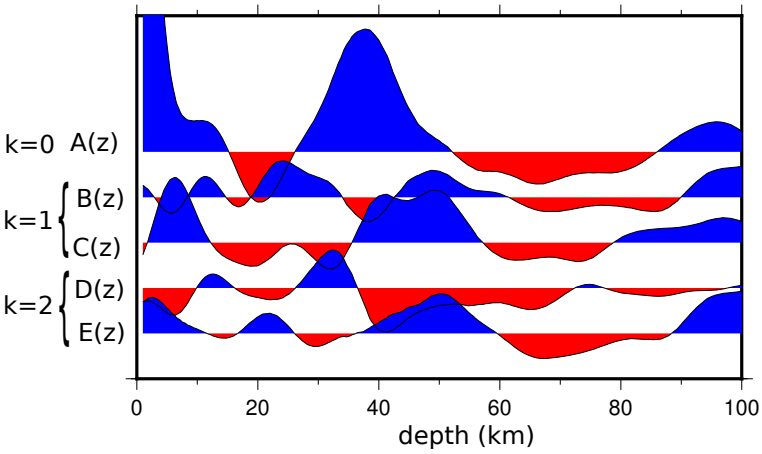


energy

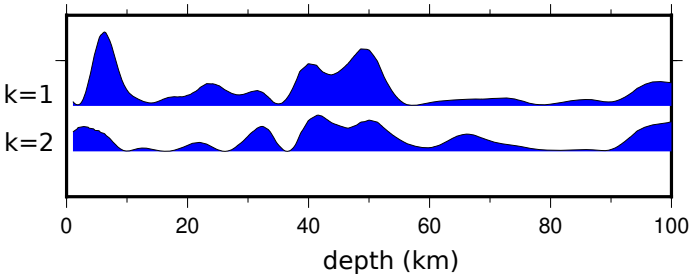


LP02

harmonics

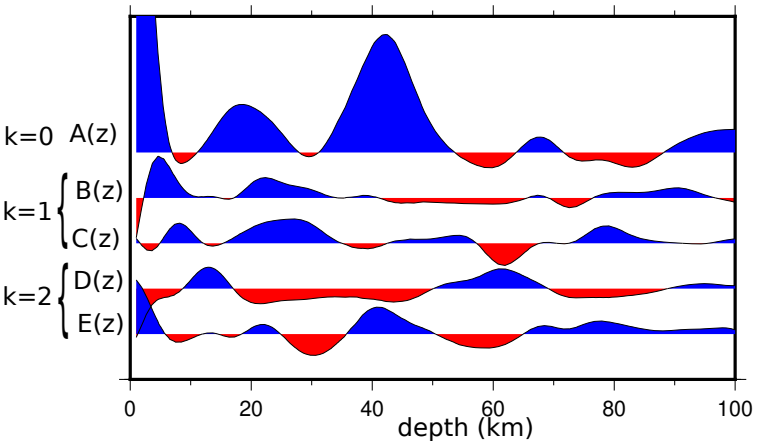


energy



LP06

harmonics



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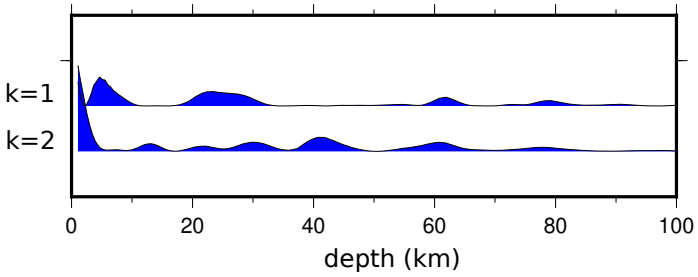
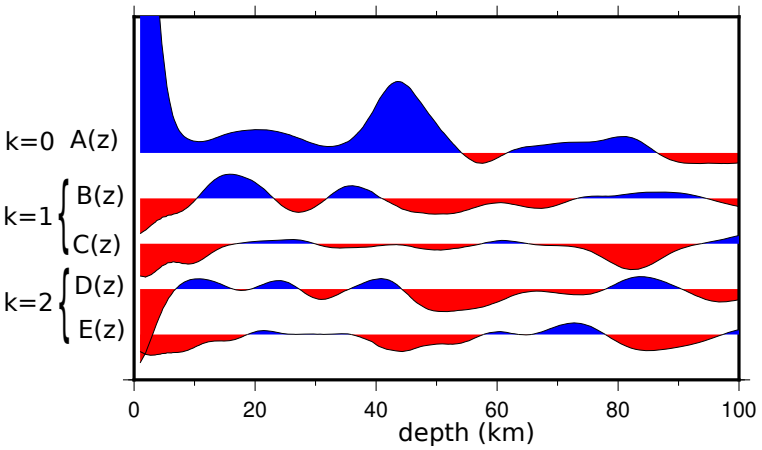
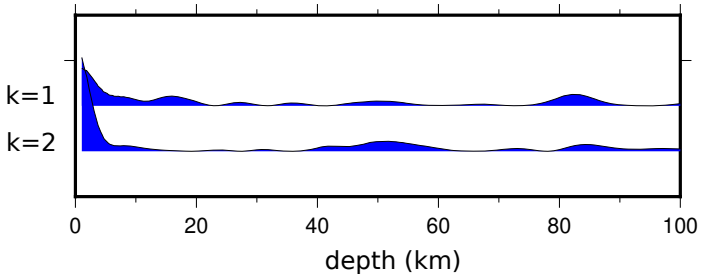


NBAN

harmonics

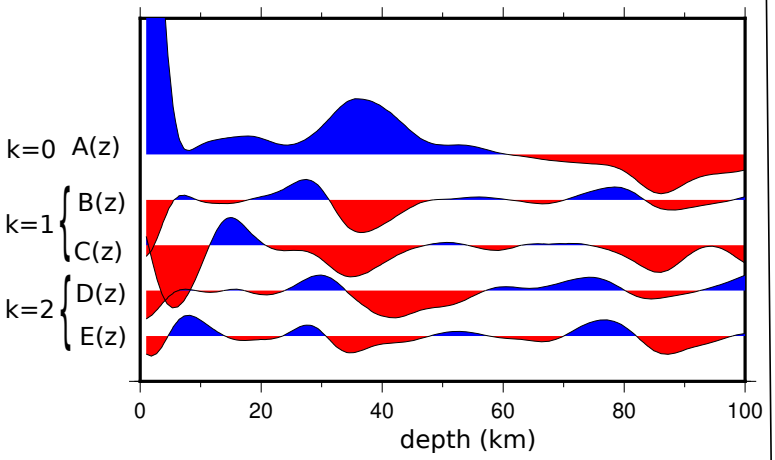


energy

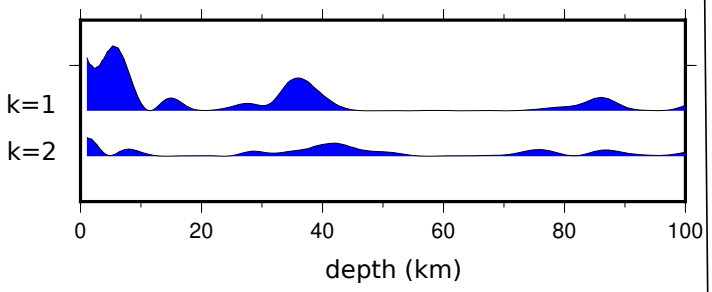


NBCL

harmonics

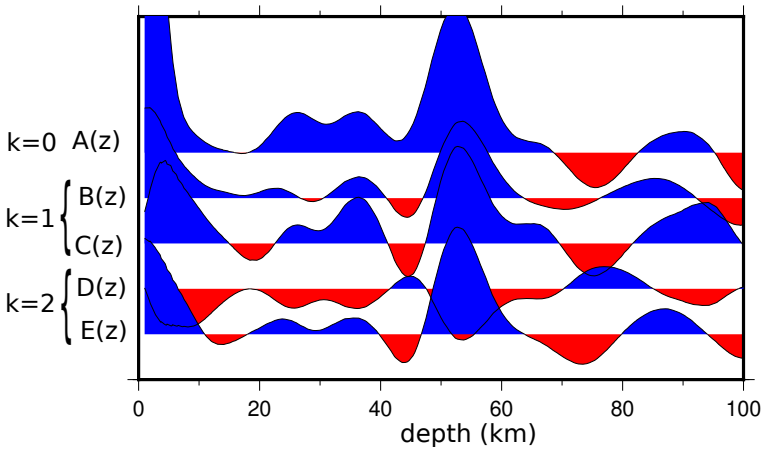


energy



NBCP

harmonics



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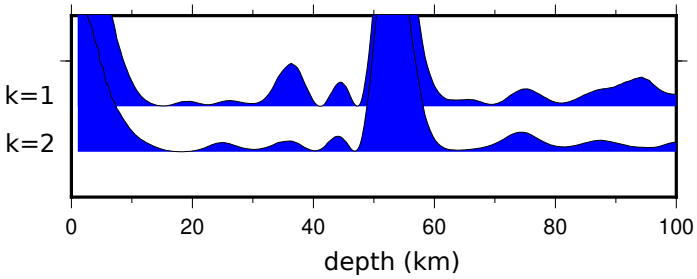
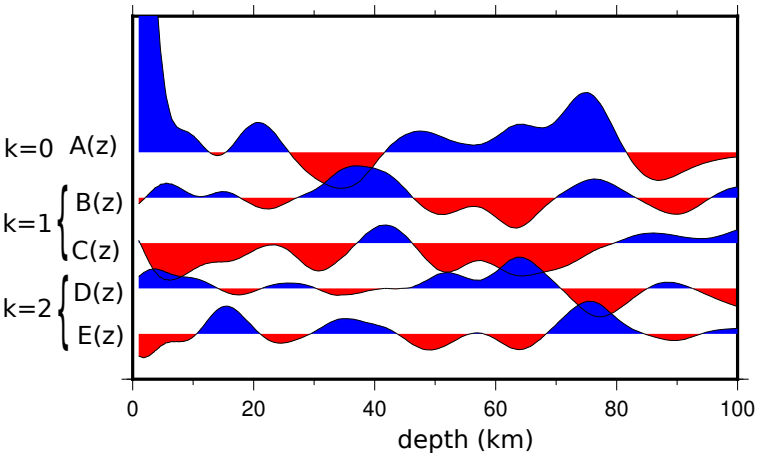


NBIT

harmonics



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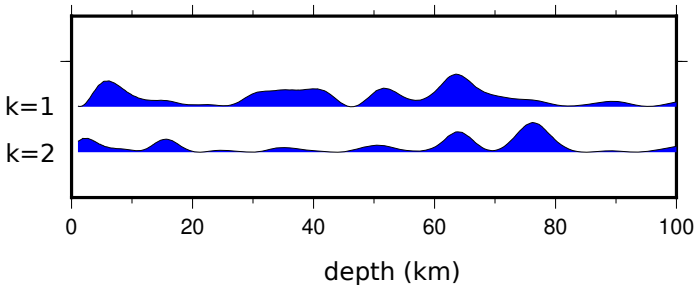
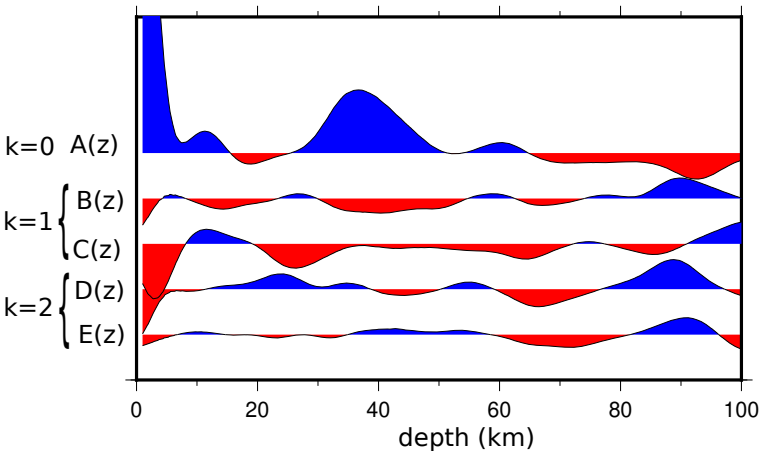
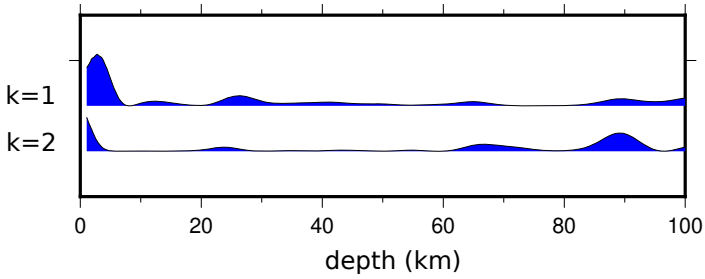


NBLA

harmonics



energy



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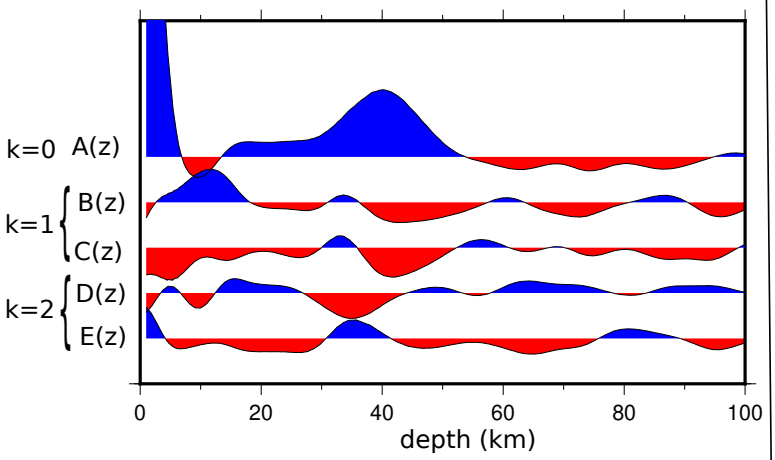
harmonics



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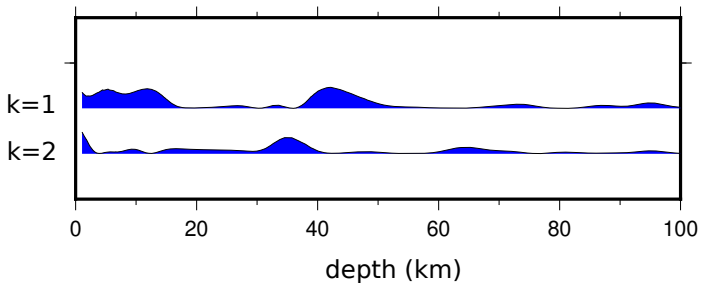

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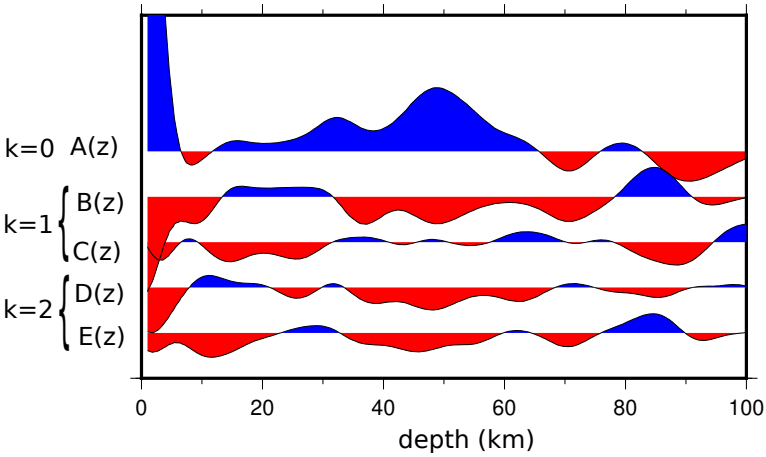

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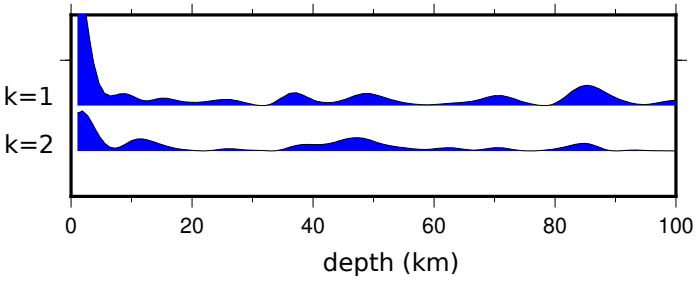

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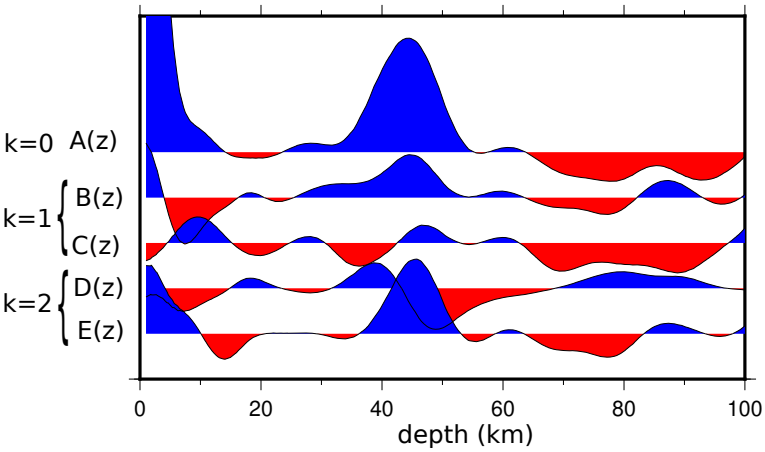

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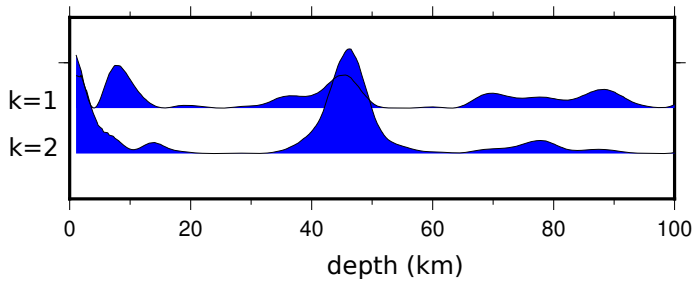

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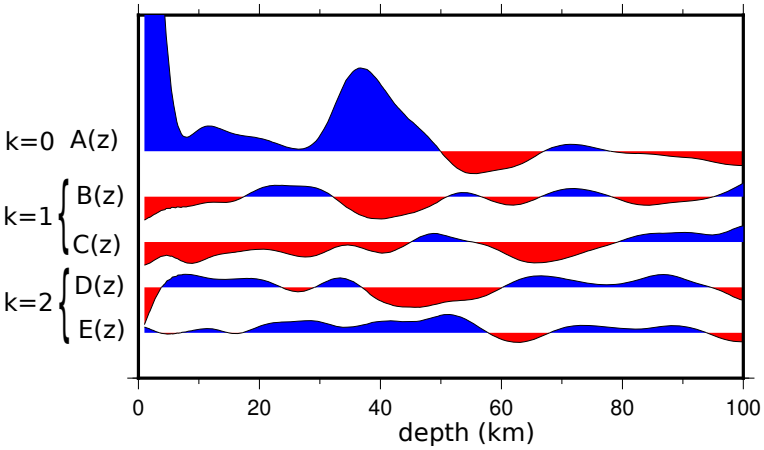

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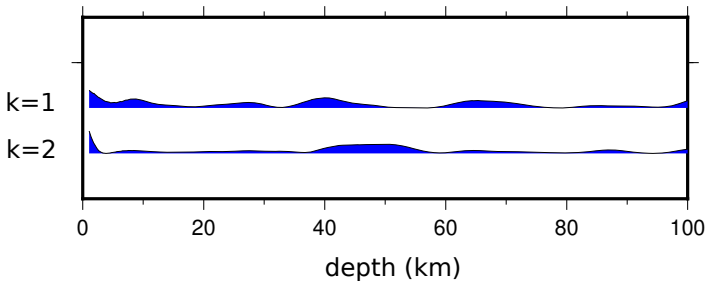

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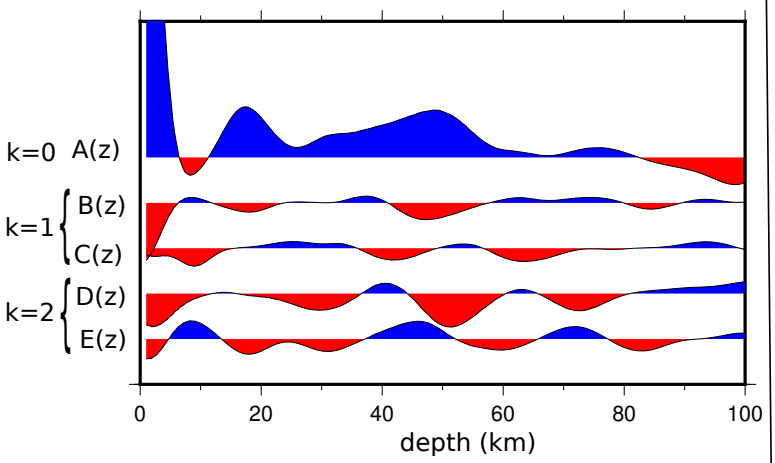

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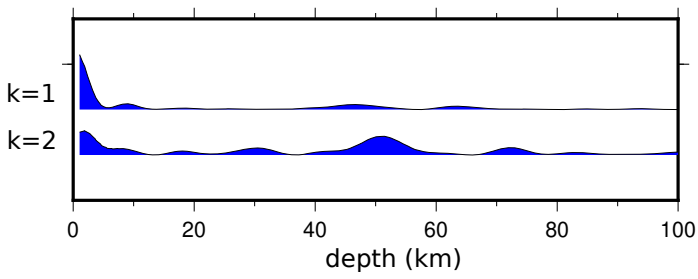

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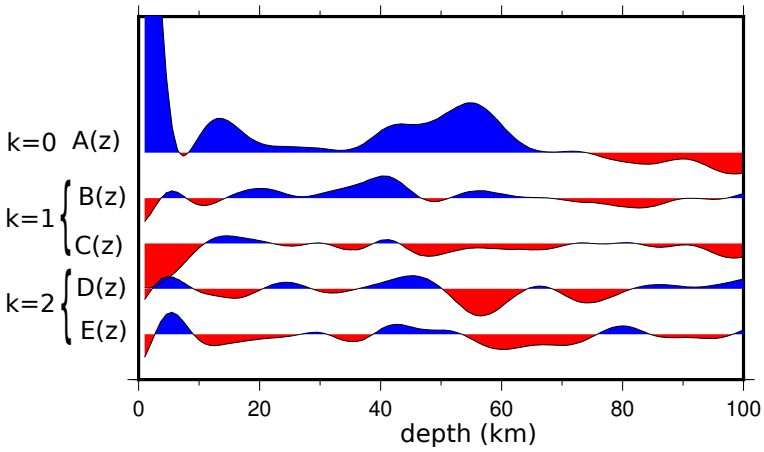

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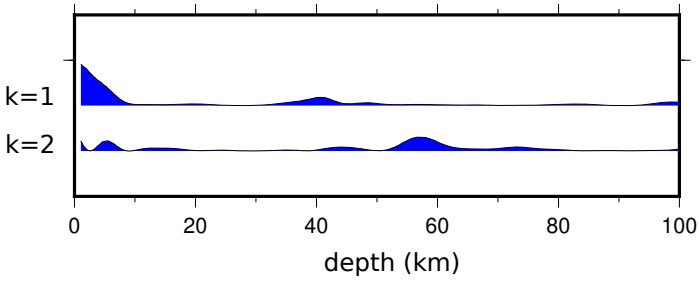

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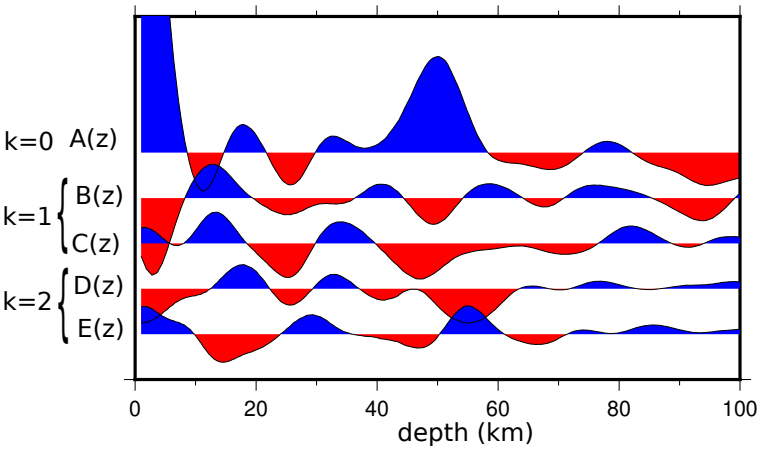

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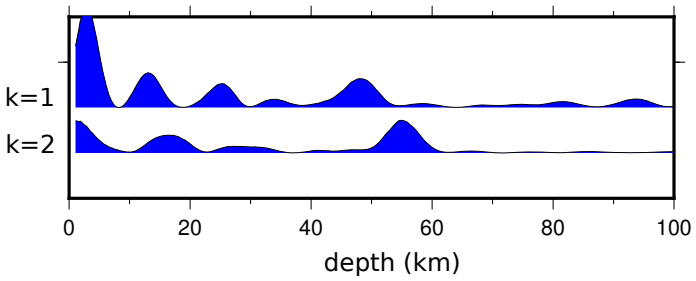

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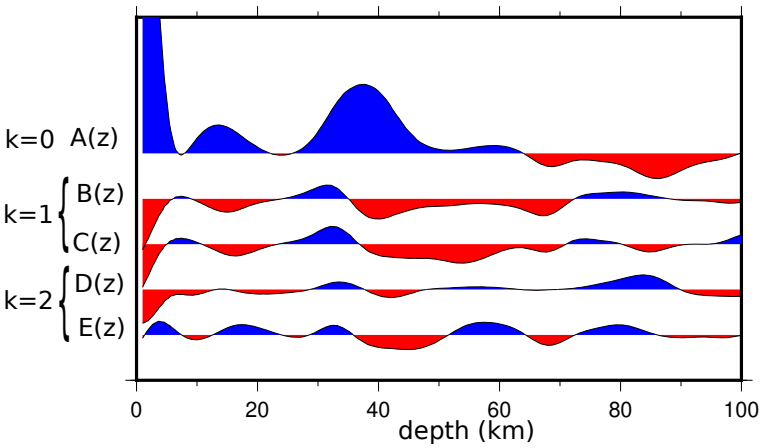

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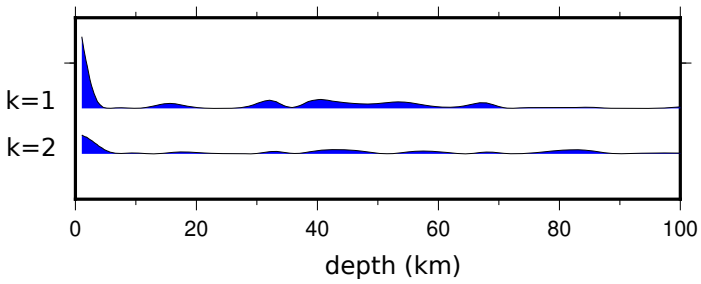

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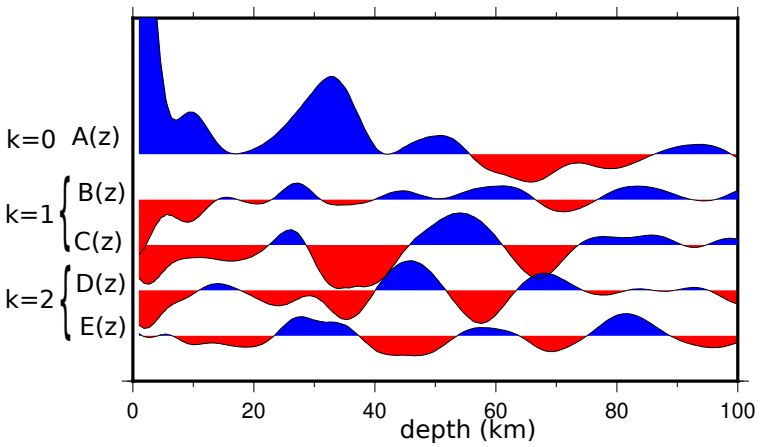

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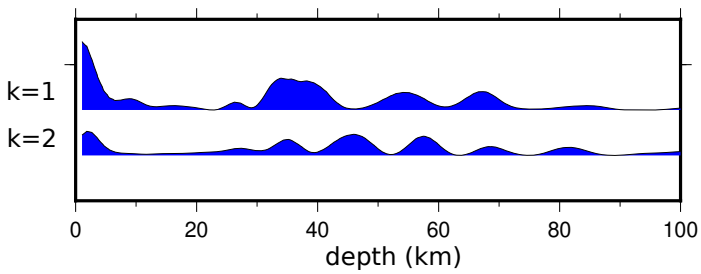

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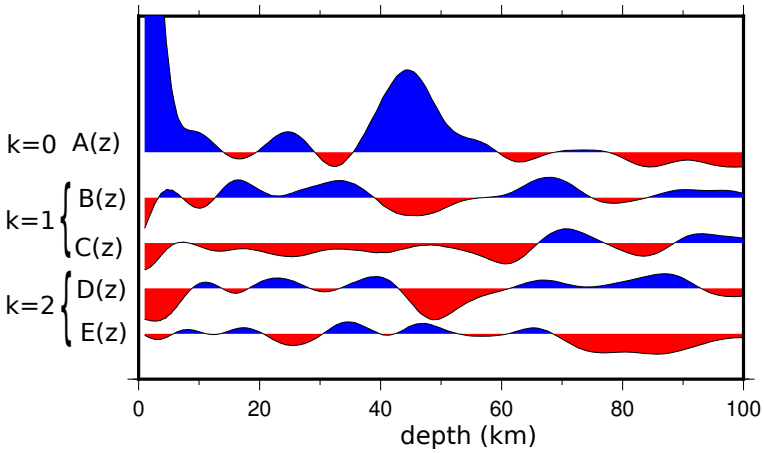

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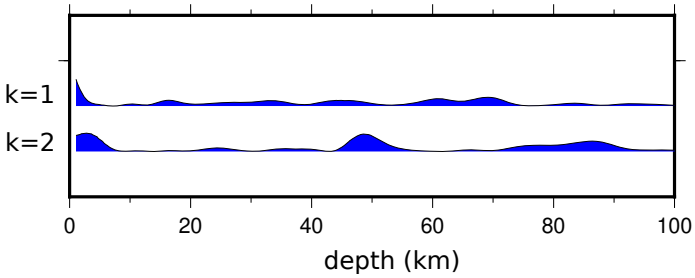

OCBR

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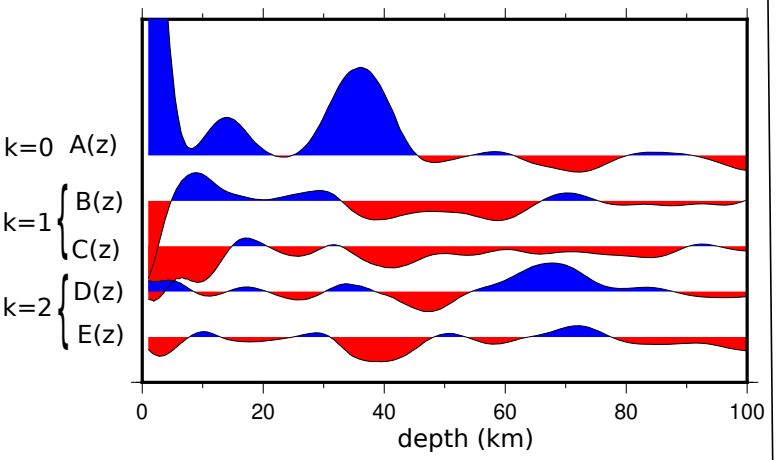

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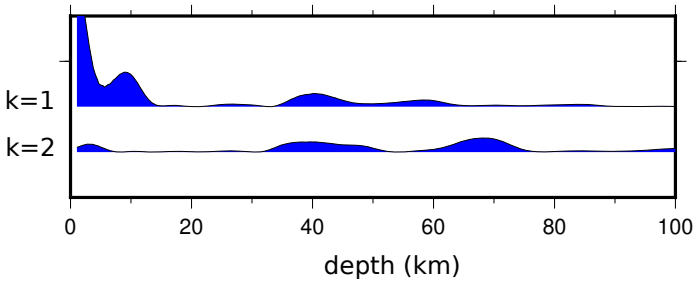

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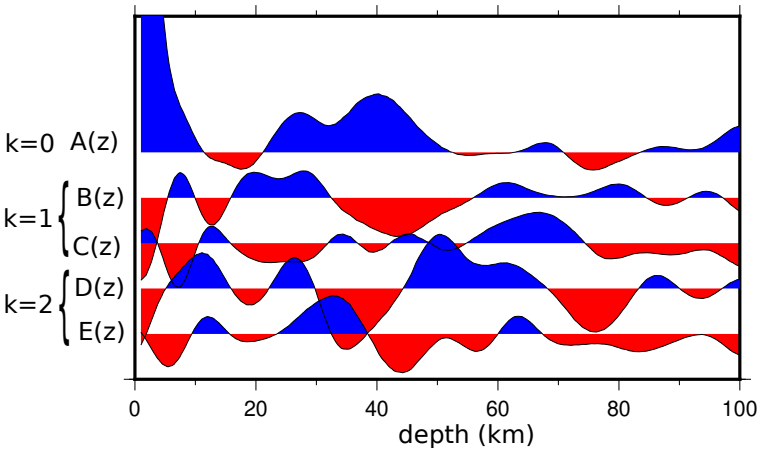

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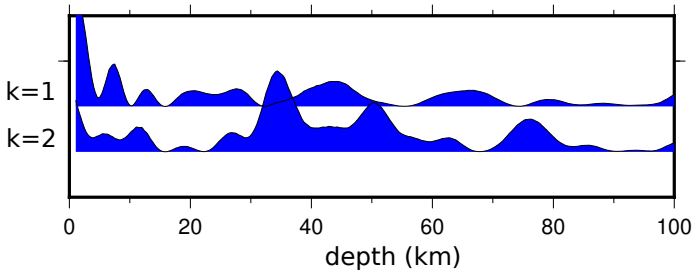

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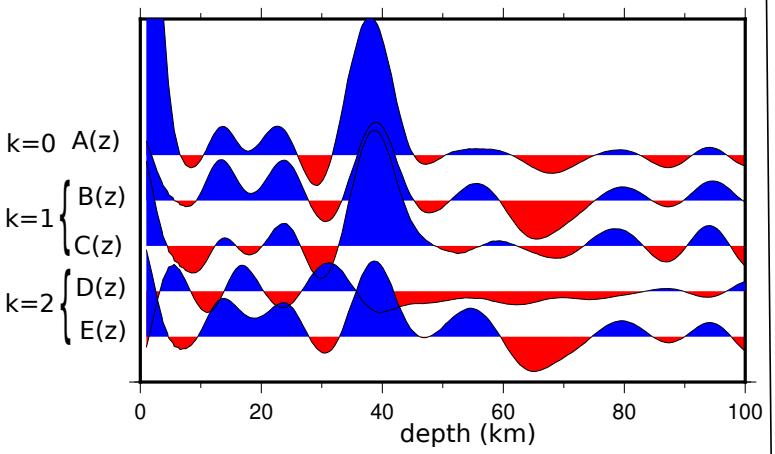

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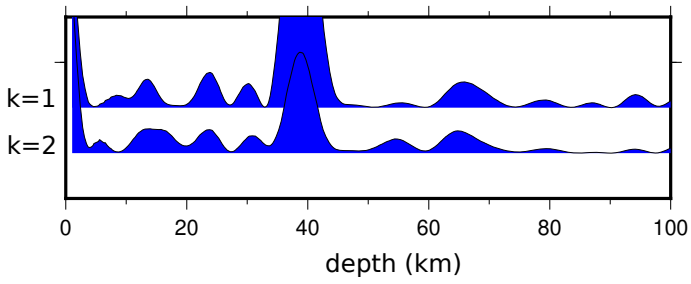

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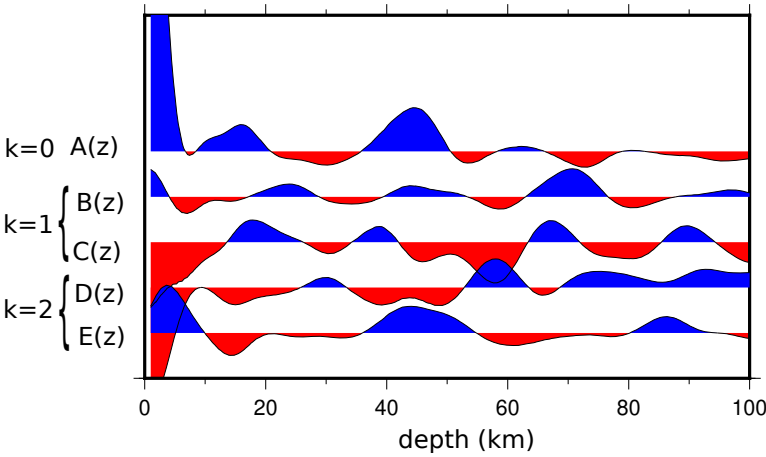

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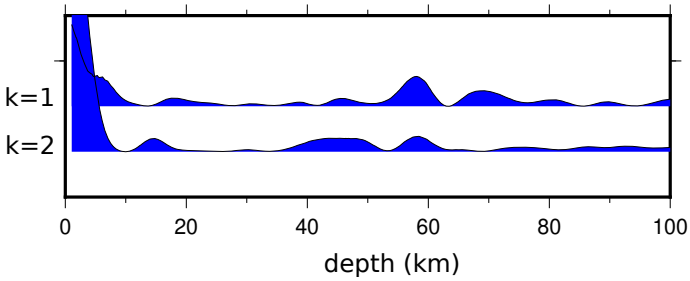

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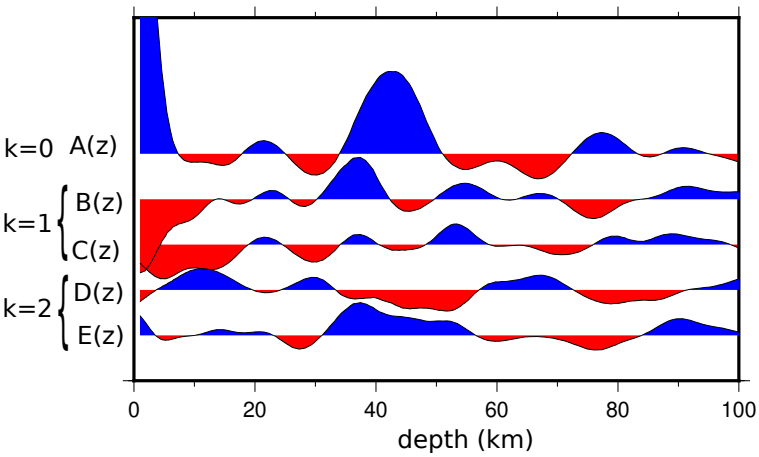

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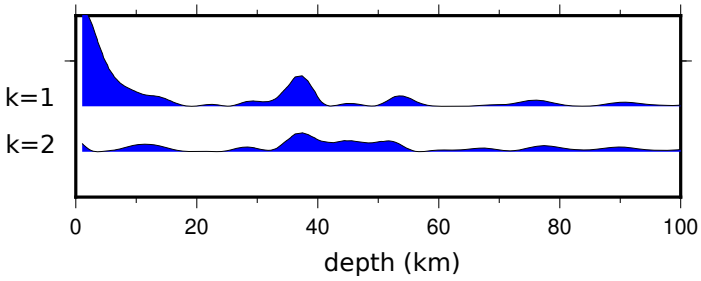

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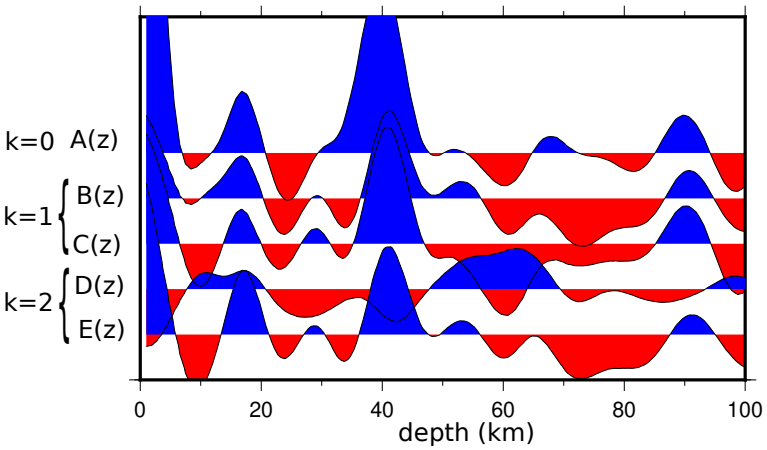

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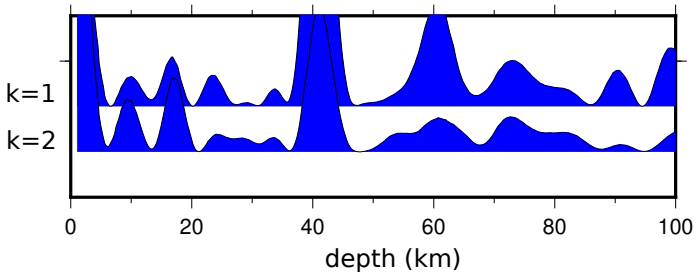

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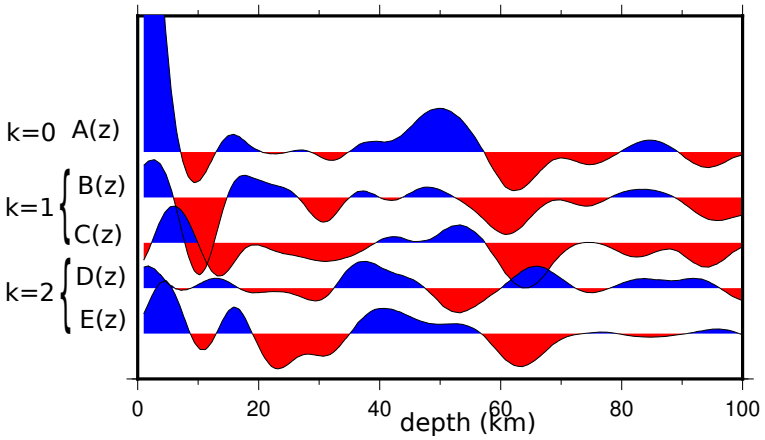

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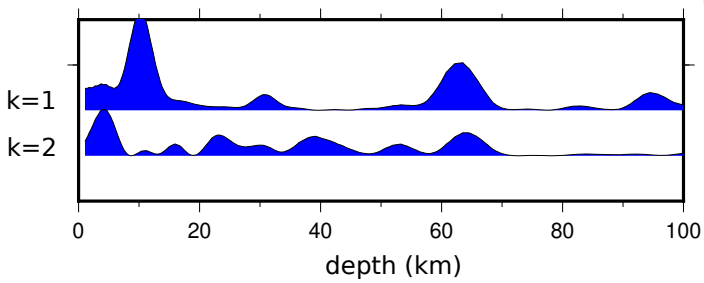

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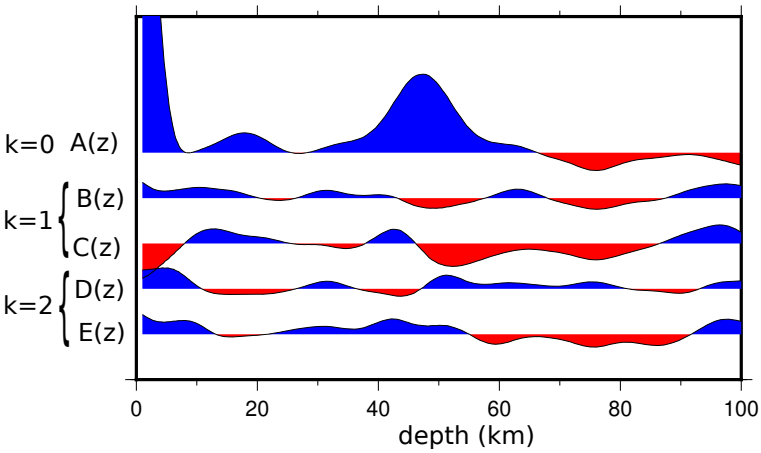

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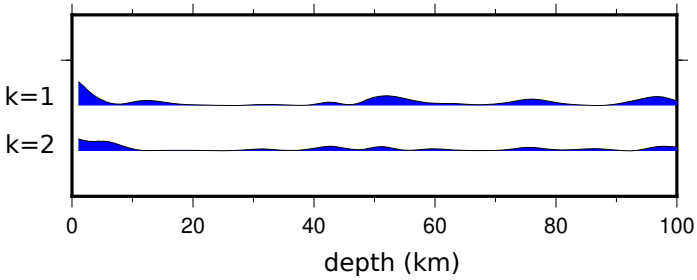

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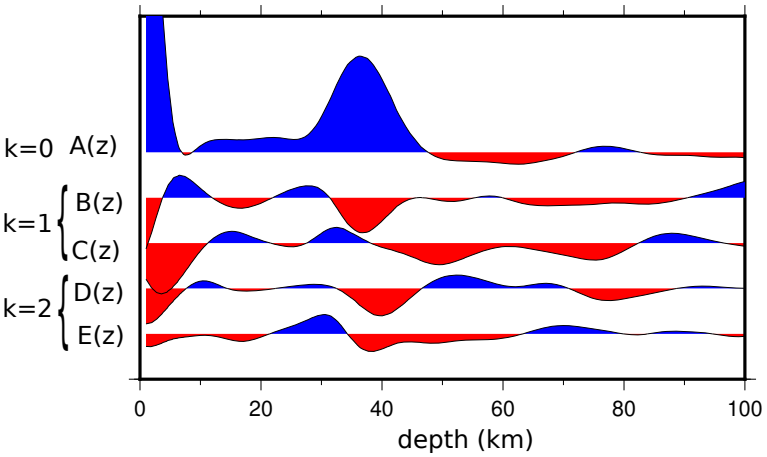

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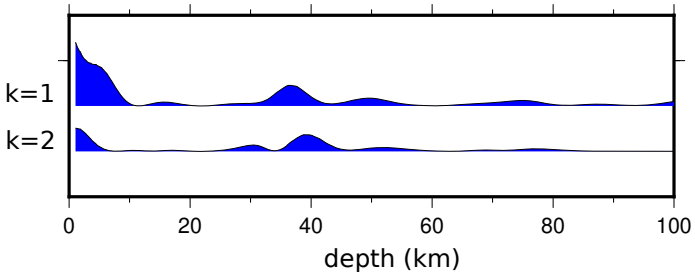

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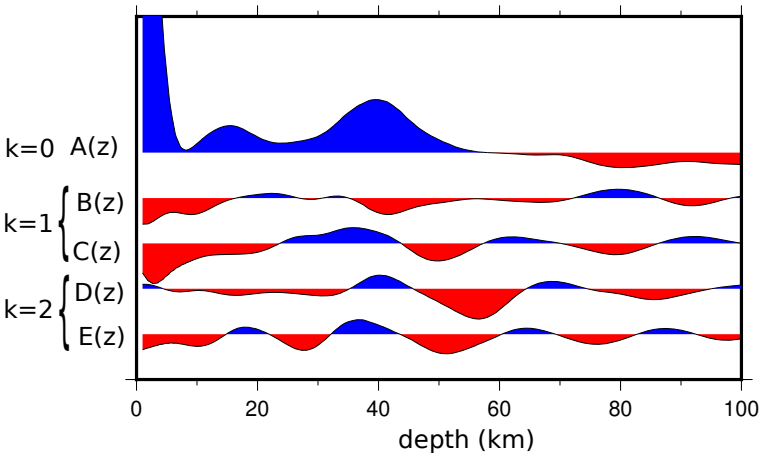

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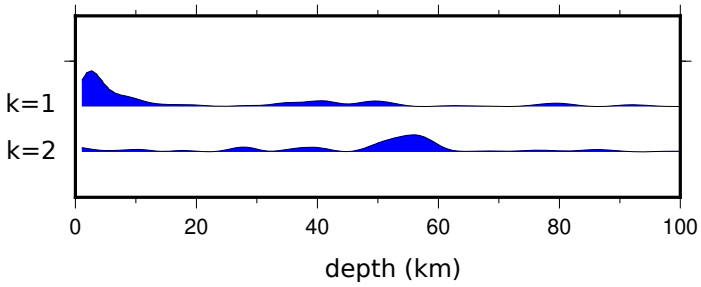

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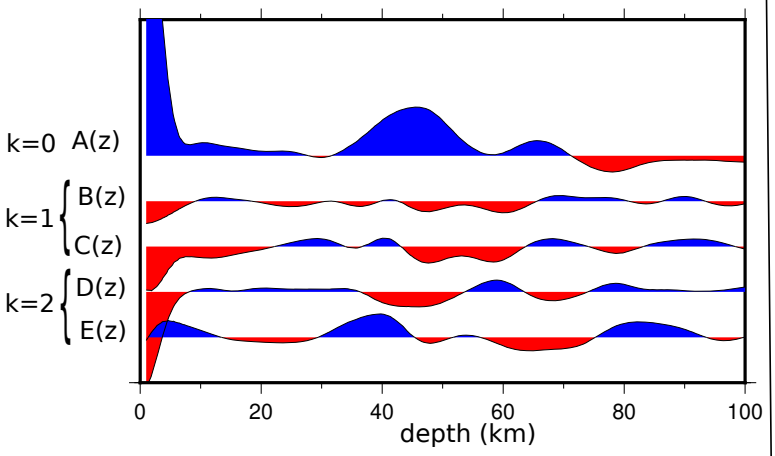

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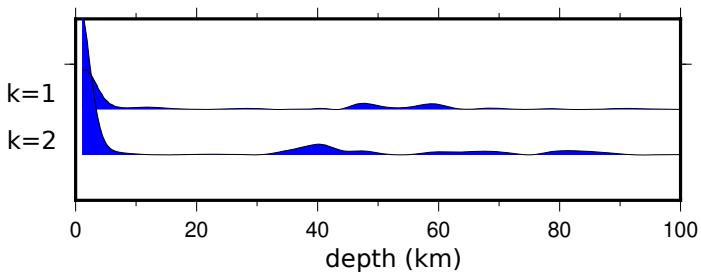

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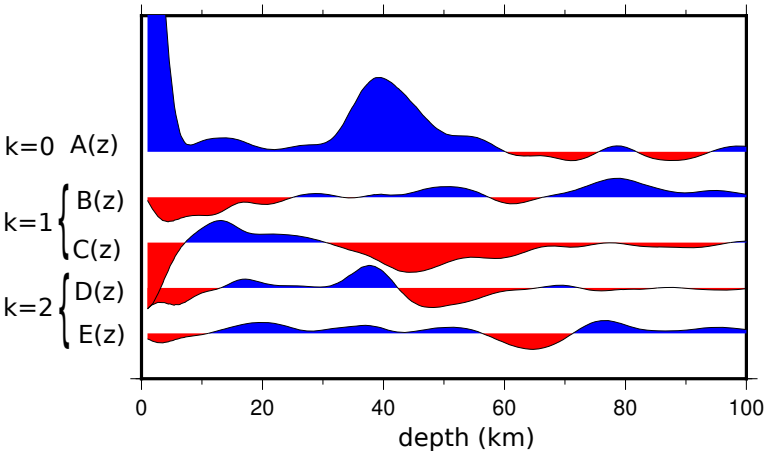

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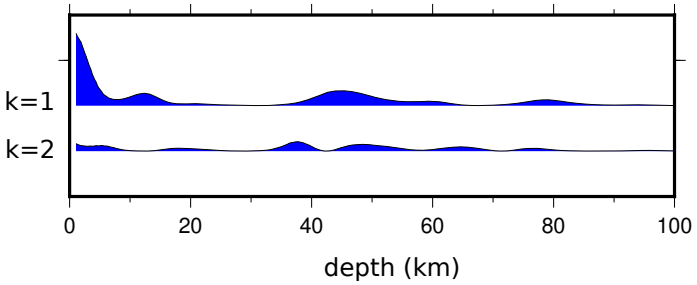

TRSB

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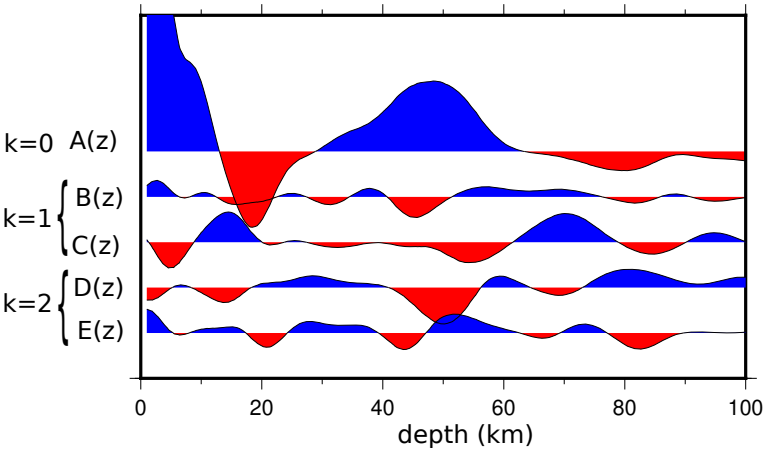

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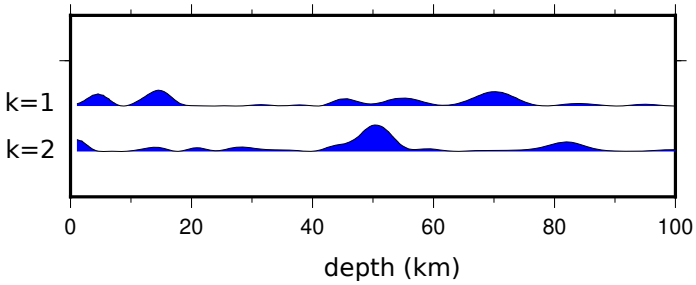

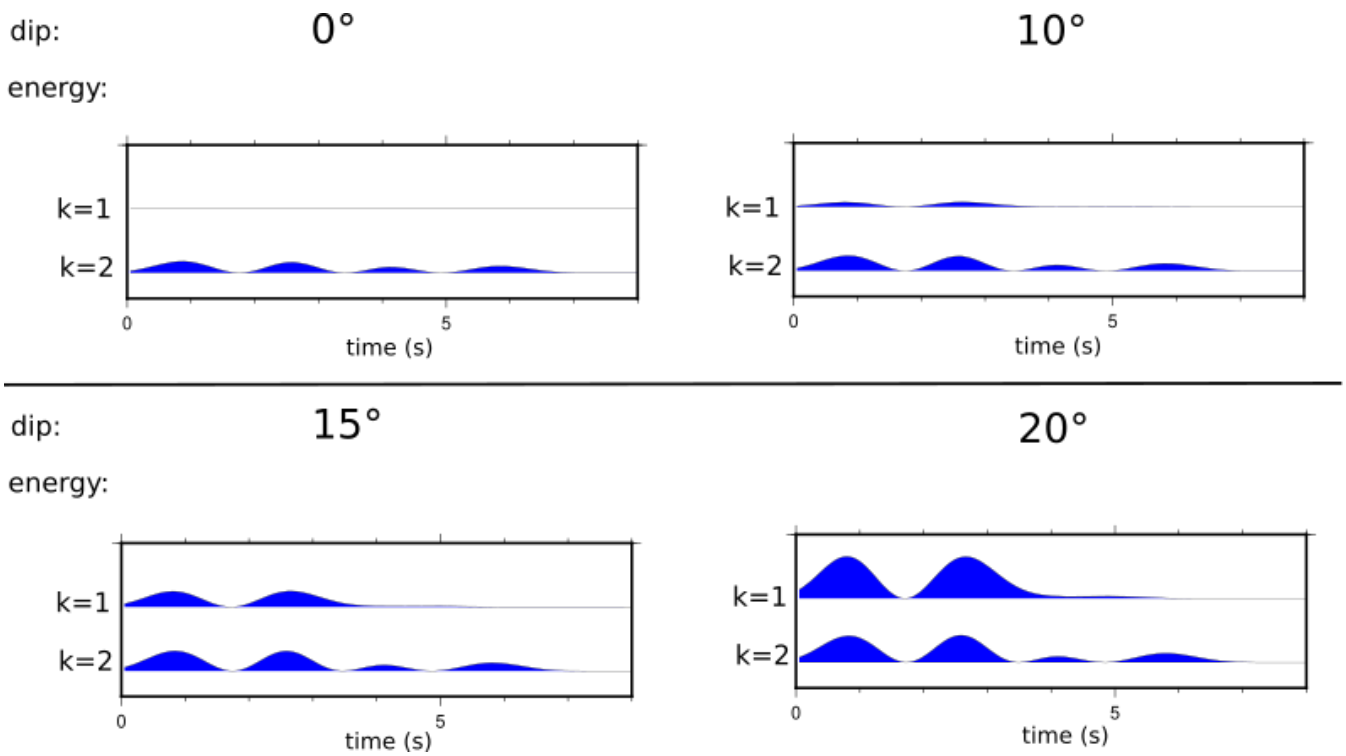

Figure S2. Energy on k=1 and k=2 harmonics are calculated for synthetics within a velocity model with 3 layers and constant Vp and Vs. The first and third layers are isotropic whereas the second layer display 6% anisotropy for both P and S-waves with fast axis dipping indicated above each corresponding graph (0, 10, 15 and 20°).