

The detailed explanation of the strong resemblance between Fourier Spectrum and Phase difference Spectrum of the Seismic Wave.(Science of Form)

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1.The phase difference Spectrum and The Phase Wave of the seismic wave.

Fig-(1). Show “The relationship between the phase difference spectrum and the phase wave” . Please refer to reference (3). Find the phase difference Spectrum from the phase wave on the right -hand side, the peak position and added an expanse state of Spectrum are in perfect harmony accord. In short (in other words), in case of the frequency of the phase wave is high, the shape of the normal distribution of the phase difference spectrum is build up sharp. And in the case of large frequency get a flat normal distribution of spectrum. This phenomena stand up all right frequency is high or low. Of course this phenomena is reversible was stated reference (3).

I shall state a next item 2, the seismic wave and this phase wave should be a one-to-one relation. And still more the Fourier spectrum of the seismic wave and the phase difference Spectrum should be a one-to-one relation.

2.The Fourier Spectrum and the normal distribution of seismic wave.

We think that the case of the epicenter length is becoming shorter little by little. The large epicenter length to get along with, the seismic wave energy is dispersed in every direction and still more had died out. As a result, the shape of the Fourier spectrum don’ t become a hill shape and happened occasionally a pointed shape. The shorter epicenter length to get along with, the shape of the Fourier spectrum of seismic wave is formed a hill and soon are considered the shape of the normal distribution.

Reference. “Earthquake” written by Seismologist KIYOO Wadachi. The Chuukou Library. (A pocket edition) 1933 and 1993(reprint) p.99

“In the near area to the epicenter, the earthquake have very sharp motion. In many case, intense vertical motion happens in the early shocks of an earthquake. The longer the epicenter length little by little, vibration of seismic wave become slow little by little and becomes superior in a horizontal vibration.” The shape of this normal distribution has flat hill and besides has large frequency of the peak of the hill. But get shorter little by little, the shape of the normal distribution (or Bell type) becomes sharp and becomes short frequency.

Moreover make the short epicenter length, we shall study the normal distribution theory (Gaussian distribution, Mt.Fuji-type or Bell type) of probability and statics.

In the reference (4), I have explained the KdV equation.(literature (3),(4))

Abstract

1. The shorter epicenter length shorter, the shape of the normal distribution becomes sharp. And this frequency too becomes small. The case of the epicenter length is large, the normal distribution of spectrum of seismic wave was not build up. Only build up a scattered peak.

2. On the case of the phase wave and the phase difference spectrum, the same phenomenon too come into being.

Reference

1. Yorihiro Osaki "Shin Jishindou no Spectrum Kaiseki Nyumon" P78.

2. Masaru NISHIZAWA. (2012): Study of shape of Mountain (Normal Distribution) of Fourier Spectrum of Earthquake Motion. May 20-25, S-SS30-P12(2012, JpGU)

3. Masaru NISHIZAWA. (2012): Handling by Solitary Wave and soliton of Earthquake Motion: October D22-01, 2012, The Seismological Society of Japan.
4. Masaru NISHIZAWA. (2015): Normal Distribution of Seismic Wave Spectrum and Solitary Wave in Water Waves (Science of Form). October 27. S01-P20, 2015, The Seismological Society of Japan.
5. Research Report on the 2011 Great East Japan Earthquake Disaster. NIED, Japan.

* Reference 1: The very excellent and the easy to understand book. I can say with confidence.

Keywords: Fourier Spectrum, Phase difference spectrum, Seismic wave, Phase wave, KdV equation, Solitary wave

