Temperature-dependent attenuation of P waves in porous media with partial gas saturation

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White(1975) discussed the dispersion and attenuation of dilatational waves in porous media submerged in liquid with partial gas saturation. In such a medium gas bubbles in the liquid absorb excess pressure in the fluid, and as a consequence the attenuation of dilatational waves is very strong. Kitsunezaki(1986) measured P wave with a very low velocity (about 500m/s) in a sand layer below water table in an exploration after the Sea of Japan earthquake in1983, and attributed the cause to the White model. The attenuation of the wave in this case was as much as Q-1 = 0.59.

On the other hand the ground vibration caused by traffic was pointed out to be weaker in summer season (Oshima, 2002). We postulate a mechanism that gas bubbles contained in ground water expand in summer to reduce the degree of saturation of ground water and to attenuate ground vibration more strongly than in winter. Based on the postulate we estimate the seasonal change in attenuation of P wave under average Japanese condition.