SEISMIC SURFACE WAVE TECHNIQUE FOR AGRICULTURAL APPLICATIONS

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A laser Doppler vibrometer (LDV) based multi-channel analysis of surface wave (MASW) method has recently been developed. In the method, an electro-mechanical shaker was used as a seismic source operating in a frequency sweeping mode to excite Rayleigh waves propagating through the surface. The surface vibrations along a straight line were detected by a moving LDV. Unlike conventional MASWs that explore soil profile from a few meters to a few tens of meters below the ground, the present MASW investigates soil depth from a few centimeters to a few meters due to its high frequency excitation and high spatial resolution of moving LDV. It is therefore more appropriate for agricultural soils applications. The method could be applied to the studies of soil surface crusting, soil moisture variation, compaction effects, layering, and underground water flow. Several case studies will be presented.