Interdisciplinary involvements of electron spin resonance (ESR) in geology and planetary sciences and in radiation dosimetry in these three decades are reviewed briefly. Studies on future ESR dating of ices in planetary surveys and natural magnetic resonance of seismo-electromagnetic signals (SEMS) are also presented in this talk. 

**ESR dating** of a stalactite at the Akiyoshi Cave (1975) based on the detection of unpaired electron generated by natural radiation has been extended to dating of fossils and minerals in geology and archaeology (anthropology)[1]. Studies on Antarctic carbonate and radiolysis of ices will be discussed in addition to the study of natural and synthetic methane hydrate. Radiolysis of ices with methane and MgSO\_4 were studied by simulating ices on Titan and Europe, satellites of Saturn and Jupiter, in addition to that of ices (H\_2O, CO\_2, CH\_4) for future ESR dating of icy bodies in our solar system.

**ESR dosimetry** of A-bomb radiation (1984) using human tooth enamel has been extended to dosimetry of radiation at Chernobyl and JCO criticality accidents. Compounds of Li-organic acids such as Li-oxalate are developed as tissue-equivalent sensitive dosimeters. **Scanning ESR imaging microscope** [1] is commercially available for studying the distribution of paramagnetic impurities, radiation dose and dangling bonds (Si wafer).

**Natural magnetic resonance** of protons and paramagnetic impurities and defects under the Earth’s magnetic field of 40-50 µT is speculated considering an earth-crust waveguide and a dielectric cavity (\(\varepsilon^* = 10^7\) at 1 Hz) of a tectonic plate surrounded by the conductive mantle and plate boundaries (faults). A scaling model experiment on the propagation of SEMS at ultra low frequency (ULF) was made using microwaves as in Fig.2 considering the scaling factor in Maxwell equations: Unusual animal behaviour before earthquakes in legends was ascribed to be caused by SEMS in the book in Fig.3.

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