Basic EM induction in the Earth

- Electromagnetic methods deal with propagation of LOW FREQUENCY and TIME VARYING magnetic fields into the earth subsurface.

- Propagating field (Primary field) can be generated by passing AC current (primary current) into a number of closed loop systems (known as Transmitter) such as rectangular loop, square loop, small circular loop, vertical loop, grounded wire, vertical wire etc.

- Propagating field in the subsurface interacts with subsurface conducting features. Since subsurface conducting targets act like a closed loop (with inductive and conductive property L, R) , an induced emf is generated in the subsurface conductor.

- Induced emf results in induced current (Eddy current or Secondary Current) in the conducting targets.
- Induced current again generates a field known as Secondary field which propagates in 3D space.
- On the Earth's surface we record resultant of Primary and Secondary magnetic fields which are known as Resultant field.
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- This whole process is known as Electromagnetic Induction in the earth