

**Summary of**  
**“Springs of the Malvern Hills: a geological perspective”**  
**by Dr John Payne, Voice of the Malvern Hills Conference 2016**

John began by showing a geological map of the Malvern area and explaining the geological setting of the springs. These are mainly located within the Malverns Complex but also occur in terrain underlain by Triassic mudstones. The Malverns Complex consists of coarse grained igneous rocks which have been intensely faulted and jointed during a number of tectonic events. Joints (fractures with little or no movement) are the main sites along which rainwater can migrate.

John has identified four types of springs within the Malvern area:

1. Boundary springs at the contact between the Malverns Complex and impermeable sedimentary rocks
2. Fracture springs within the Malverns Complex located high on the hills and isolated from lower aquifers.
3. Valley bottom springs within the Malverns Complex, issuing from the base of rock debris accumulated along valley bottoms.
4. Springs overlying Triassic rocks but issuing below a layer of soliflucted material derived from erosion of the hills during the ice age.

The Malverns spring water was hailed in the 19<sup>th</sup> century as containing no impurities. However, analysis of the spring water shows quantities of iron, sulphate, carbonate and chloride which are significantly higher than rain water.

Research carried out by John over a period of years indicates that the residence time of water within the rock is about two months.