

The temperature dependence of the power received by an ultrasound transducer from the backscatter of an interrogating pulse is dependent on how certain ultrasonic tissue characteristics (speed of sound, attenuation and backscatter coefficient) change with temperature. A theoretical parametric analysis showed that the temperature dependence of the backscatter coefficient dominates the variation of the received power with temperature. According to this analysis the power received by the transducer could either increase or decrease depending on the type of tissue and the inhomogeneities within the tissue. We have confirmed this experimentally *in vitro*. By capturing the RF signal from a single A-mode scan we have been able to identify individual scatterers and follow these scatterers as signals were obtained at temperatures from 37–50 °C. The change in energy of these scatterers can increase or decrease with temperature and is for the most part monotonic. Typically we have seen a change of between 5 and 15 dB in backscattered energy over the temperature range of 37–50°C. The envelope of a collection of scatterers can be used to infer the temperature of the tissue by analyzing the statistics of the collection. We found that the standard deviation of backscattered power increased monotonically with temperature and was accurately approximated by a second-order polynomial. Thus far we have segmented the individual scatterers by hand. We are also working on utilizing automatic techniques such as matched filters and arbitrary segment intervals. Supported in part by R21 CA90531.