

This file provides information about the T1 Mapping image sets in the folders QIBA\_v12\_Tofts\_GE and QIBA\_v12\_Tofts\_Siemens.

This data set is similar to version 9 (sampling interval and offset (dynamic images only), S0, and noise vary), but this set also varies T1 tissue.

Two sets of images are provided. DICOM part 10 format images are in the DICOM directory. XML files are in the XML directory. The XML images allow the values for the DICOM tags to be altered using a text editor, and new DICOM images can then be generated using dcm4che's tool called "xml2dcm," available at <http://www.dcm4che.org/confluence/display/d2/dcm4che2+DICOM+Toolkit>.

This series provides T1 mapping images corresponding to the appropriate dynamic images. Tissue T1, S0, and simulated noise level (sigma) are varied. Noise was applied using the formula  $A = \sqrt{(R + r1)^2 + (r2)^2}$  where A is output "actual" signal intensity with noise, R is the input "noiseless" signal intensity, and r1 and r2 are gaussian noise with mean 0 and SD sigma.

The fixed parameters used to generate this data are:

Repetition Time = 5 msec

Assumed T1 (in blood vessel) = 1440 msec

The T1 tissue values used are {200, 500, 2000, 5000} msec.

For each series, the value of S0 in tissue equals the value in the blood vessel.

The signal intensity images were generated for the following different flip angles: 3, 6, 9, 15, 24, 35 degrees. The files in the T1 Mapping folders have the following flip angles:

filename	flip angle (in degrees)
fa3	3
fa6	6
fa9	9
fa15	15
fa24	24
fa35	35

The JSim model T1\_S0\_model\_20110902.proj was used to generate the signal intensity images. This model can be downloaded from a link provided on the QIBA page of our website. A link to download the JSim software is also provided.

The signal intensity for the T1 mapping images was calculated using Equation 1 in the paper Comparison of three physiologically-based pharmacokinetic models for the prediction of contrast agent distribution measured by dynamic MR imaging, Barboriak DP, MacFall JR, Viglianti BL, Dewhirst MW. J Magn Reson Imaging. 2008 Jun;27(6):1388-98.

The data in the test image is organized as follows: The top 50\*70 pixels in the image represent the tissue. The vascular region of interest is the bottom 50\*10 pixels strip of the image.

The naming convention for the study folders is

"<sampling interval>\_jit\_<timing offset>\_T1\_<T1\_tissue>\_S0\_<s0 value>\_sigma\_<sigma value>".

Thus, 6s\_jit\_0s\_T1\_200\_S0\_500\_sigma\_5 has a sampling interval of 6 seconds, an offset of 0 seconds (dynamic data only), a T1 tissue value of 200, an S0 value of 500, and a sigma value of 5.