The fit*.sav files created by the MultiScanAB procedure contain the following data:

Input parameters for the code:

LibFileName – name of the used DLL or SO library.

modelFileName – name of the used GX Simulator model file (*.sav).

EBTELfileName – name of the used EBTEL table file (*.sav).

DEM_on, DDM_on – keys indicating (1/0) whether the respective DEM and DDM tables are used or not.

freqList – array of the emission frequencies, in GHz.

sxArr, syArr – arrays of the characteristic sizes of the instrument beam \sigma_x and \sigma_y in x and y directions, at different frequencies, in arcseconds.

beamArr – (multi-frequency) map object containing the shapes of the instrument beams at different frequencies.

a, b – a and b parameters of the heating model.

Qstart – the initial value of the Q0 parameter.

Qstep – the initial relative step over Q0 to search for the optimal heating rate value.

iso – a key indicating whether the isothermal (1) or multi-thermal (0) plasma emission formulae were used.

threshold_img – the relative threshold value to compute the image masks.

metric – the metric to minimize, a three-letter string ("rho", "chi", or "eta").

MultiFreq_on – a key indicating whether the initial search for the best fit was performed at all frequencies simultaneously (1), or all minimizations were performed strictly frequency-by-frequency (0).

fixed_shifts – a key indicating whether the shifts applied to the observed maps were fixed (1) or computed automatically each time to provide the maximum correlation with the model maps (0).

Simulation results (all values correspond to the obtained best-fit Q0 values):

bestQarr - array of the obtained best-fit heating rates Q0 at different frequencies.

chiArr, rhoArr, etaArr – arrays of the obtained rho^2, chi^2, and eta^2 metrics at different frequencies; only one of those metrics (defined by the "metric" parameter) was actually minimized.

CCarr – array of correlation coefficients between the model and observed images at different frequencies.

ItotalObsArr, ItotalModArr – arrays of the total observed and model radio fluxes at different frequencies (in relative units).

ImaxObsArr, ImaxModArr – arrays of the maximum observed and model radio fluxes (i.e., brightness temperatures) at different frequencies.

IthrObsArr, IthrModArr – arrays of the thresholds used to compute the image masks for the observed and model images at different frequencies; they equal ImaxObsArr*threshold_img and ImaxModArr*threshold_img, respectively.

obsImageArr – (multi-frequency) map object containing the observed radio maps rebinned to match the best-fit model maps at the corresponding frequencies. In addition to the standard fields, the maps contain also the fields shiftX and shiftY indicating the shifts applied to the observed maps.

obsImageSigmaArr – (multi-frequency) map object containing the maps of the instrumental noise. These maps are rebinned and shifted in the same way as the above-mentioned obsImageArr radio maps.

modImageArr – (multi-frequency) map object containing the best-fit model radio maps at different frequencies. The maps are not convolved with the instrument beam.

modImageConvArr – (multi-frequency) map object containing the above-mentioned best-fit model radio maps convolved with the instrument beam.

modFlagArr – 2D array (N_freq * 6) containing some additional information returned by the image computing procedure. For each frequency, the following data are provided:

flag[0] – total number of voxels in the coronal part of the GX Simulator model, within the field of view.
flag[1] – unused (always zero).
flag[2] – out of flag[0], number of voxels associated with closed field lines (where the loop length L and heating rate Q are known).
flag[2] = flag[3] + flag[4] + flag[5].
flag[3] – out of flag[2], number of EBTEL table hits (where both L and Q are within the table).
flag[4] – out of flag[2], number of EBTEL table misses due to the loop length (where L is beyond the table).
flag[5] – out of flag[2], number of EBTEL table misses due to the heating rate (where Q is beyond the table).

If the algorithm failed to find the best-fit heating rate at a certain frequency, the corresponding values of bestQarr, etc. are set to NaN, and the corresponding image maps contain all zeros.

<u>Additional simulation results (a log of the minimization process):</u>

allQ – array of all Q0 values where the computations were performed (N_Q elements).

allMetrics – 2D array (N_Q * N_freq) of the corresponding image metric values. The metric specified by the "metric" parameter is presented.

The above two parameters are defined only for the multi-frequency minimization approach (MultiFreq_on eq 1); otherwise they are set to zeros.

The Summary*.sav files created by the MultiScanAB procedure contain the following data:

<u>Input parameters for the code:</u>

modelFileName, EBTELfileName, DEM_on, DDM_on, freqList, iso, threshold_img, metric, MultiFreq_on, fixed_shifts – same as in the fit*.files.

alist, blist – arrays representing the (a, b) grid nodes.

ObsID – same as the input ObsDateTime parameter.

<u>Simulation results (all values correspond to the obtained best-fit Q0 values):</u>

bestQ, chi, rho, eta, CC, ItotalObs, ItotalMod – same as the corresponding values (with "Arr" suffix) in the fit*.sav files, but in the form of 3D arrays (N_a * N_b * N_freq).

shiftX, shiftY – shifts applied to the observed radio maps, 3D arrays (N_a * N_b * N_freq), in arcseconds.

The SearchForLocalMinimumAB procedure creates the same fit*.sav and Summary*.sav files as described above, with the following differences:

The files contain also the threshold_metric parameter – the threshold value (relative to the minimum metric, >1) that determines the area of "good agreement" between the model and observations in the (a, b) space.

Only one frequency is considered, so that the parameters freqList, bestQarr, etc. are 1-element arrays, and the parameters bestQ, eta, etc. are (N_a * N_b * 1) arrays.

MultiFreq_on always equals 1.

In the Summary*. sav files, if the data for a certain combination of a and b are missing (because those combinations were beyond the area of interest), the corresponding values of bestQ, eta, etc. are set to -1. Therefore, when analyzing the results, only the points where, e.g., bestQ is finite and bestQ > 0 should be considered.