CAF dataset for Allen Reference Atlas

The following description is related to Allen Reference Atlas CAF dataset available with the following links: live preview, dataset details. The CAF dataset was created by ?ukasz Wa?ejko and Piotr Majka.

Detailed description of volume preprocessing:

1. Fetch `AtlasAnnotation25.sva` sparse volume file from ABA Website.
2. Coordinates in this volume are expressed in Mouse_ABAvoxel_1.0 (`ABAvoxel, INCF:0100`) SRS, in which units of measurements are voxels. In order to express coordinates in stereotaxic coordinates (with bregma point as origin of the coordinate system), the volume has to be transformed into Mouse_ABAreference_1.0 SRS (`ABAreference, INCF:0101`).

3. Such transformation is given by the TransfomPOI INCF DAI service (ie. this request).

4. Tranformation may be calculated from 4 points in `ABAvoxel` SRS (`p1, p2, p3, p4`) and 4 corresponding point in `ABAreference` SRS (`p1', p2', p3', p4'`) by solving following equation:

After all, matrix **M** is:

```
M=
[[  2.71693750e-02  -8.17542750e-05  -5.01197500e-04  -1.25701700e+00]
 [  8.92628250e-04   2.82020000e-02  -2.71143000e-04  -1.28628500e+00]
 [ -5.86774750e-04  -8.96920500e-04  -2.59281250e-02   6.04778000e+00]
 [  0.00000000e+00   1.73472348e-18   0.00000000e+00   1.00000000e+00]]
```

and **M'**:

```
M'=
[[  1.00000000e+00  -2.89888217e-03  -1.93302640e-02  -1.25701700e+00]
 [  3.28542063e-02   1.00000000e+00  -1.04574858e-02  -1.28628500e+00]
 [ -2.15969175e-02  -3.18034359e-02  -1.00000000e+00   6.04778000e+00]
 [  0.00000000e+00   6.15106544e-17   0.00000000e+00   1.00000000e+00]]
```

Then, initial volume from `AtlasAnnotation25.sva` is transformed using **M'** and the resulting volume is used by the 3dBAR parser to create CAF dataset.

Below you may find comparison of brain outlines created using raw volume (dark gray) and volume after transformation (light gray):