

fMRI解析の参考資料

(5) ROI解析前の準備

- WFU Pickatlasの準備
- Marsbarの準備



■ WFU Pickatlas

- https://www.nitrc.org/projects/wfu_pickatlas/

■ Marsbar

- <https://sourceforge.net/projects/marsbar/files/>

The image is a composite of three screenshots illustrating the process of downloading and installing WFU PickAtlas.

Top Left: NITRC Website
 The NITRC (Neuroimaging Tools & Resources Collaboratory) website is shown. A search bar at the top contains the text "3.0.5 (SPM12 or SPM8 revision 4010+ Update): WFU_PickAtlas_3.zip (46061 K)". A red box highlights this search result. Below the search bar, the "WFU_PickAtlas" section is visible, showing download options and statistics.

Top Right: Windows File Explorer
 The File Explorer window shows the path "Downloads > WFU_PickAtlas_3 > WFU_PickAtlas_3.0.5b". A red box highlights the contents of this folder, which include:

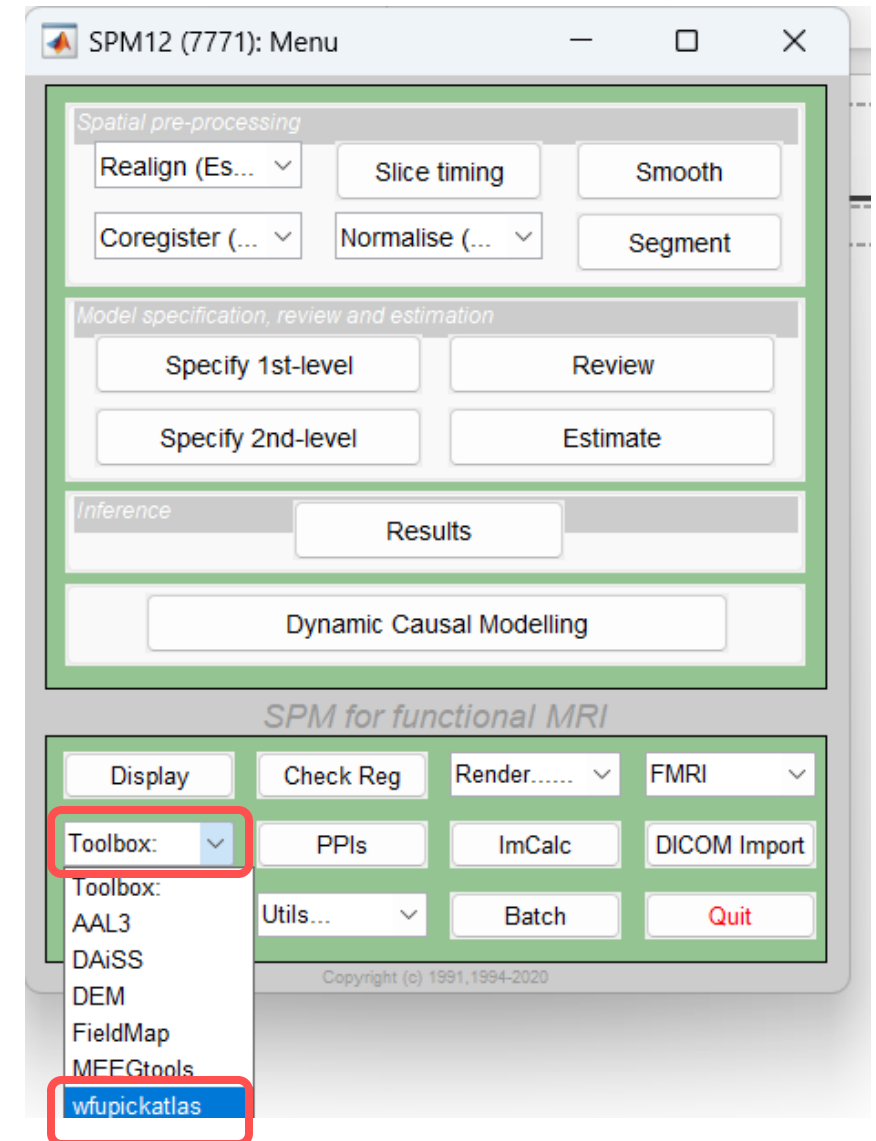
- Files: ADDENDUM, ChangeLog, ChangeLog.txt~, WFU_PickAtlas_Developers_Manual..., WFU_PickAtlas_User_Manual_v3.0
- Folders: wfu_pickatlas, wfu_results, wfu_tbx_common

 A red box also highlights the text "Copy these files to spm12 > toolbox" with an arrow pointing to the MATLAB path in the bottom right screenshot.

Bottom Right: MATLAB File Explorer
 The MATLAB File Explorer window shows the path "MATLAB > R2023b > toolbox > spm12 > toolbox". A red box highlights this path, indicating where the files from the previous step should be copied.

- Download the zip.file (Register and Log in if you don't have an account)
- Unzip 'WFU_PickAtlas_3' and you will get 'WFU_PickAtlas_3.0.5b'
- Copy all files in 'WFU_PickAtlas_3.0.5b' to 'spm12 > toolbox'

- Then it can be accessed from SPM GUI ->Toolbox ->wfupickatlas



Home / Open Source Software / Scientific/Engineering / Bio-Informatics / MarsBaR ROI toolbox for SPM / Files

MarsBaR ROI toolbox for SPM Files

Status: **Beta** Brought to you by: [matthewbrett](#)

Summary **Files** Reviews Support Mailing Lists Tickets Discussion

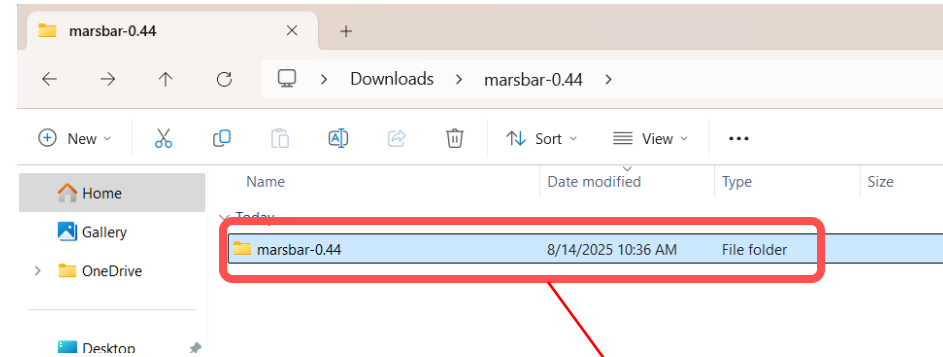
Download Latest Version
marsbar-0.44.zip (465.8 kB)

Get an email when there's a new version of MarsBaR ROI toolbox for SPM
Enter your email address

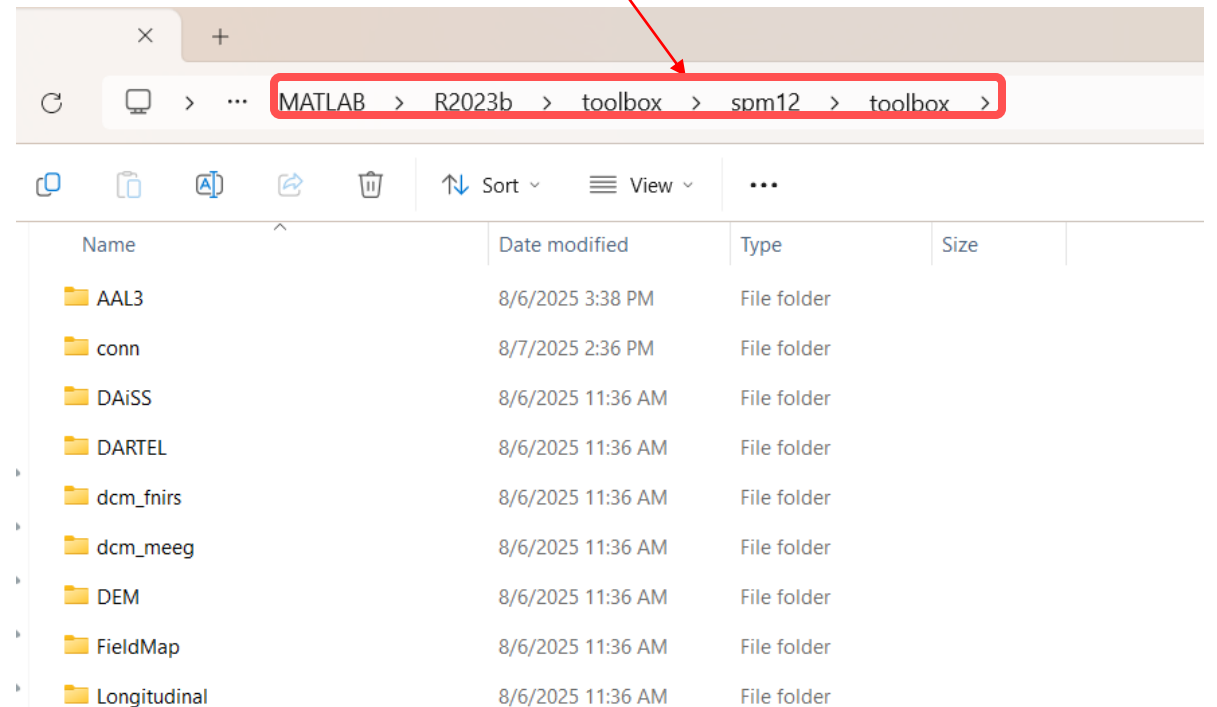
Home

Name	Modified	Size	Downloads / Week
marsbar	2015-01-23		4
marsbar example data	2009-10-02		0
marsbar-devel	2009-07-10		0
marsbar AAL ROIs	2005-02-15		0

- Download the latest Version
- Unzip it and you will get 'marsbar-0.44'
- Rename 'marsbar-0.44' to 'marsbar'
- Copy 'marsbar' to 'spm12 > toolbox'

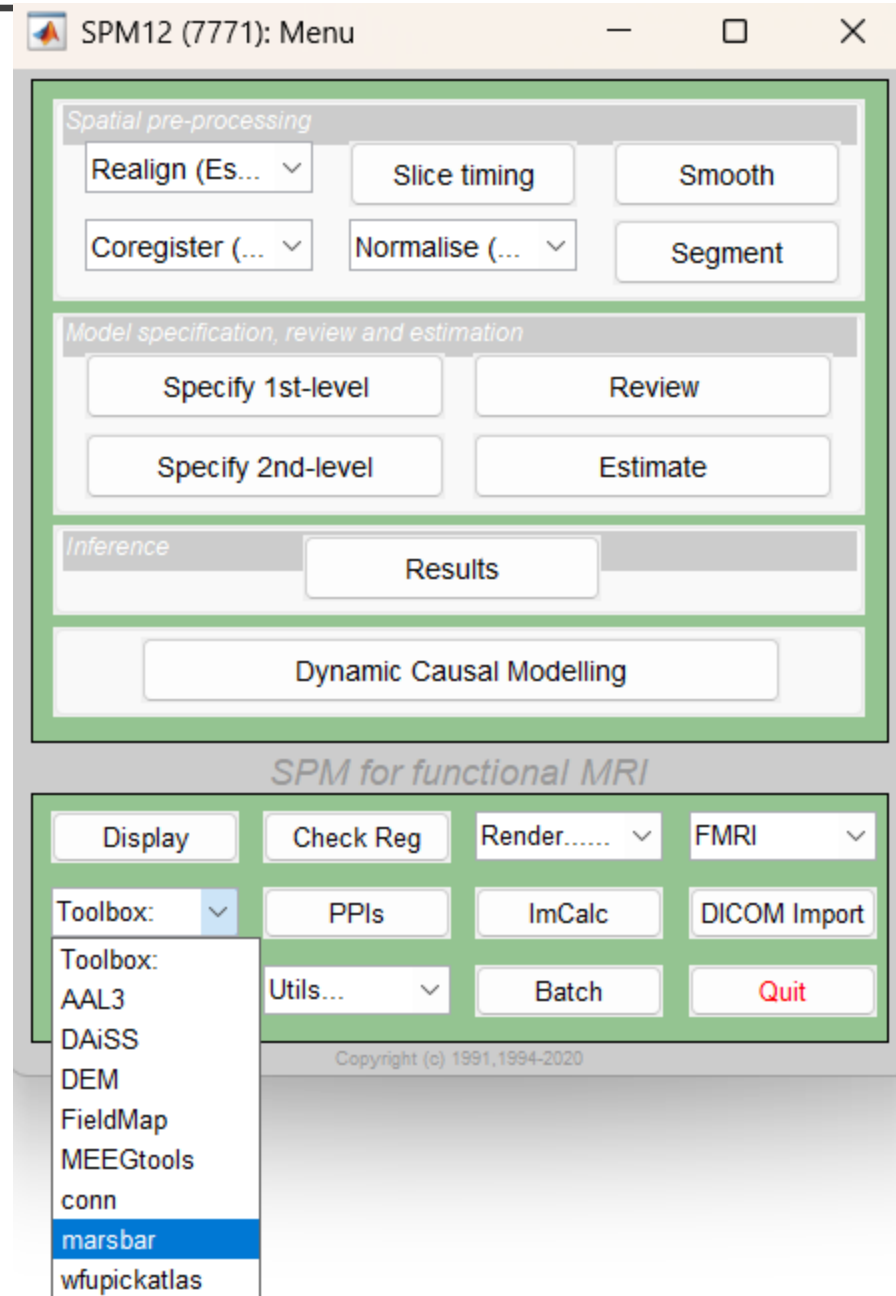


Copy it to spm12 > toolbox



Marsbarの準備

- Then it can be accessed from SPM GUI ->Toolbox ->marsbar



fMRI解析の参考資料

(6) ROI (Region of Interest)解析

応用認知神経科学センター・助教 Chunlin LIU

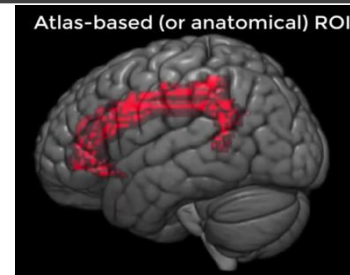


- ROI (Region of Interest) = 関心領域
 - 解剖学的領域 (Atlasに基づく) や機能的領域 (先行研究/解析結果のクラスター)
 - 目的: 特定の領域に絞って統計的検出力を高める
 - ROI解析とは、ROI mask ボクセルの一部 (サブセット) からデータを抽出する手法です。
 - ROI解析の前提は、研究者がすでに明確な仮説を持っていることです。
-

- ROI (Region of Interest) = 関心領域
- Can be anatomical (based on atlas) or functional (from literature coordinates/analysis clusters)
- Goal: Increase statistical power by focusing on specific regions
- ROI analysis is a method of extracting data from a ROI mask (subset of voxels).
- The premise of ROI analysis is that the researcher already has a clear hypothesis.

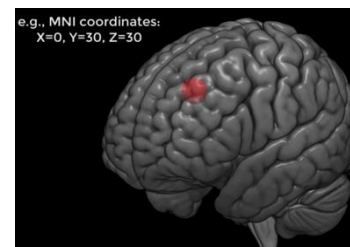
■ 解剖学的ROI

- AAL3(automated anatomical labeling)
 - *wfu_pickatlas* に実装
 - https://www.nitrc.org/projects/wfu_pickatlas/



■ 機能的ROI

- 文献に記載された座標から
 - *Marsbar*などのツールを通して
 - <https://sourceforge.net/projects/marsbar/files/>



■ Anatomical ROI

- AAL3(automated anatomical labeling)
 - Implemented on *wfu_pickatlas*
(https://www.nitrc.org/projects/wfu_pickatlas/)

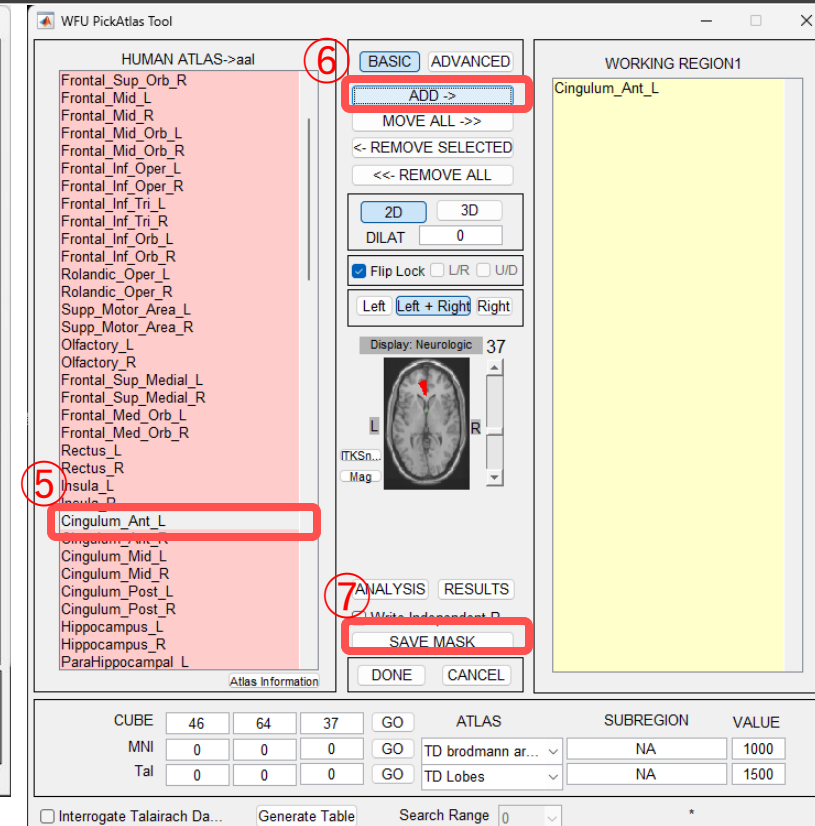
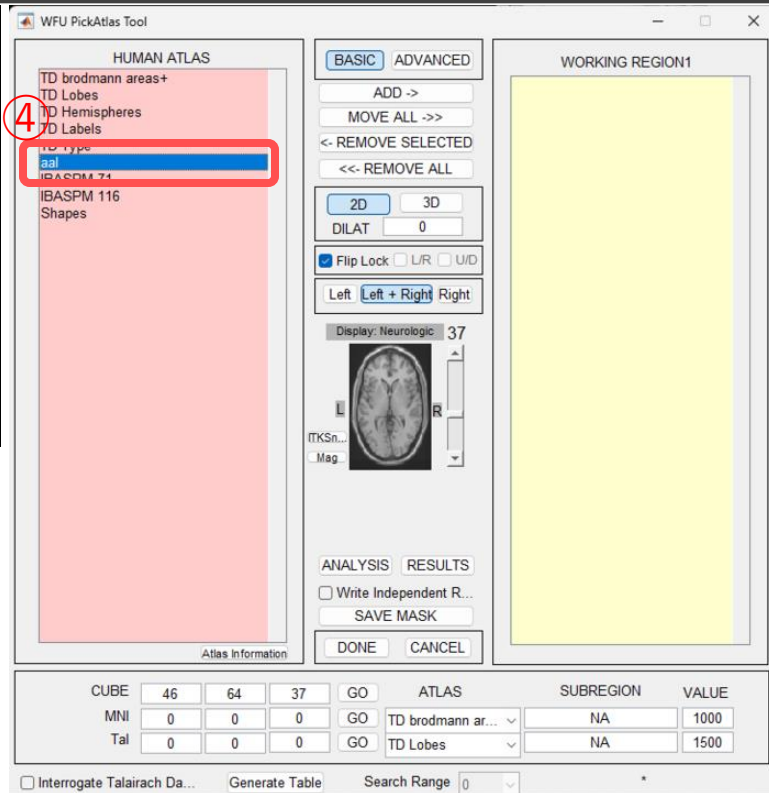
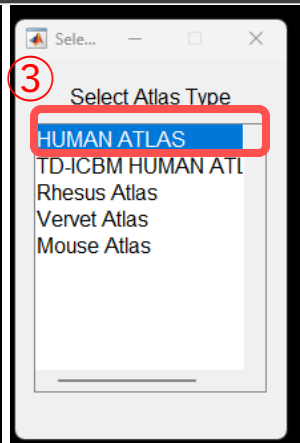
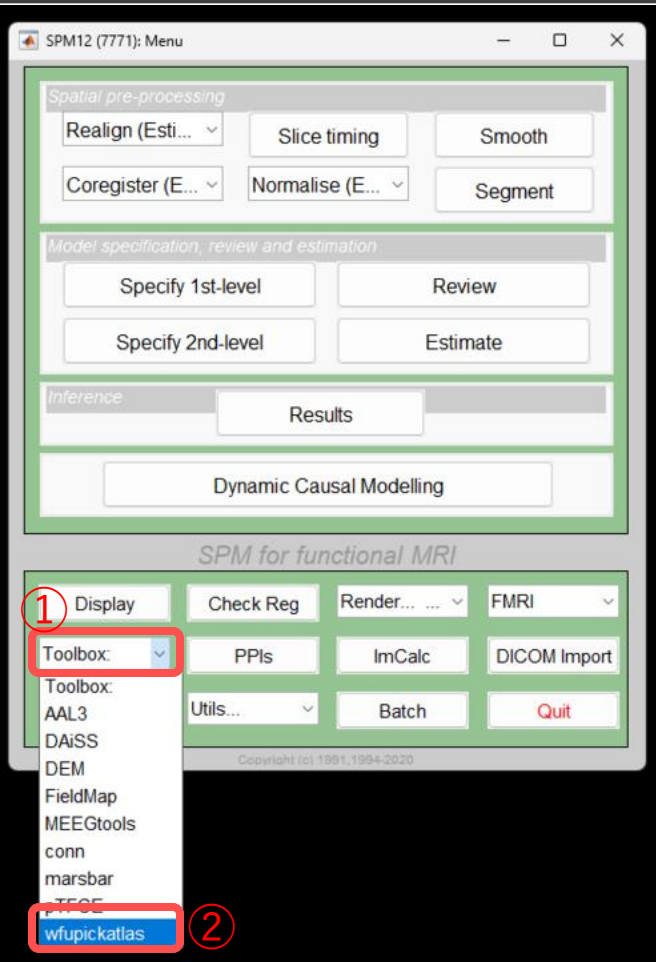
■ Functional ROI

- from literature coordinates
 - Through toolboxes such as *Marsbar*
 - <https://sourceforge.net/projects/marsbar/files/>

- ROIを定義（ツールボックス（wfupickatlas や Marsbar など）を使用して）
- β 画像やコントラスト画像から信号を抽出
- 統計検定（t検定、ANOVA、相関など）
- 可視化（棒グラフ、散布図など）

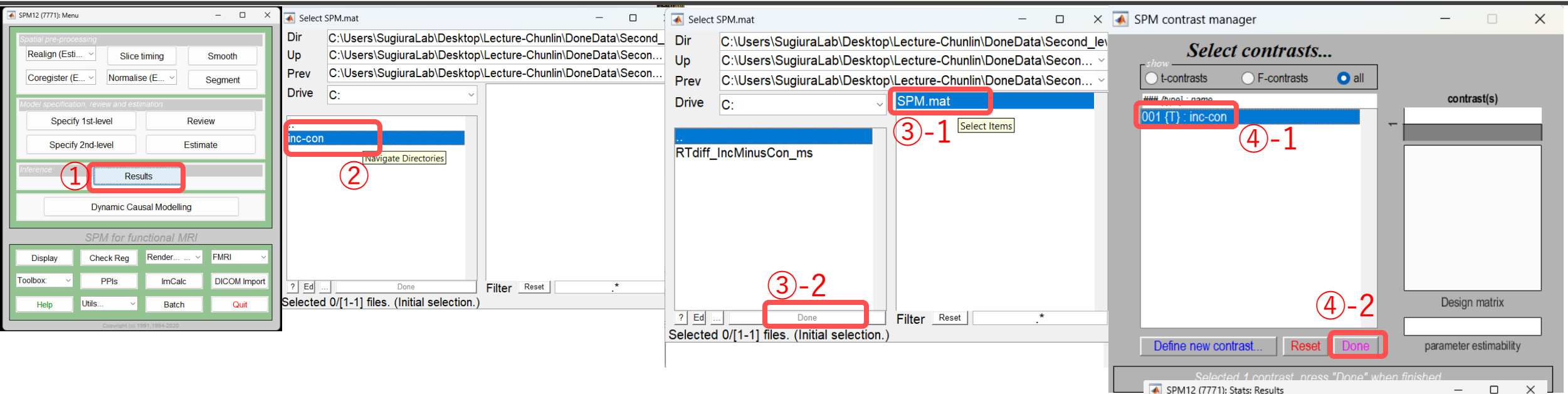
-
- **Define ROI** (using toolbox such as wfupickatlas or Marsbar)
 - **Extract signal from beta or contrast images**
 - **Perform statistical tests (t-test, ANOVA, correlation)**
 - **Visualize (bar plots, scatter plots, etc.)**

AALを用いて解剖学的ROIマスクを作成する / Create anatomical ROI Mask using AAL

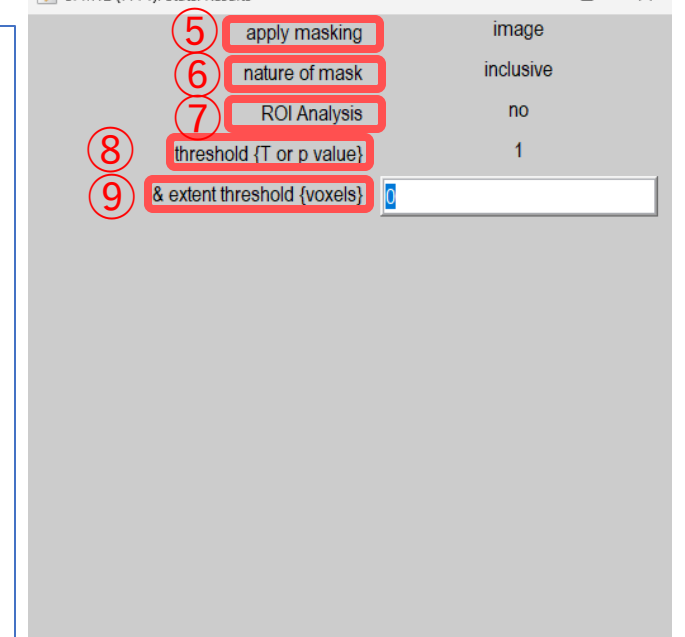


1. Click **Toolbox** in SPM.
2. Select the toolbox: **wfupickatlas**.
3. Choose **HUMAN ATLAS**.
4. Select **AAL**.
5. Select the desired ROI.
6. Click **ADD**.
7. Click **SAVE MASK**.

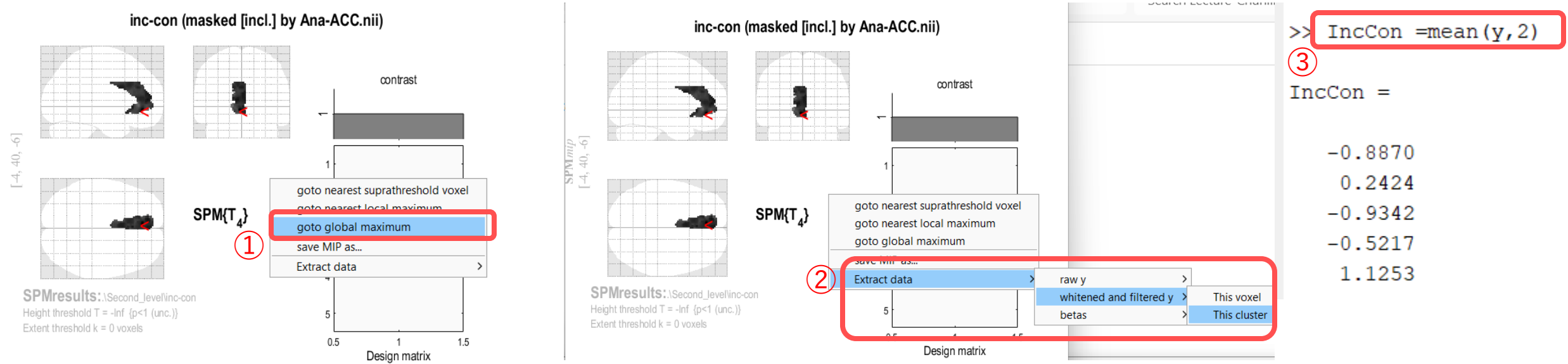
解剖学的マスクからデータを抽出する/Extracting Data from the Anatomical Mask¹²



1. Click 'Results' from the SPM GUI.
2. Click the folder **Second_level**→**inc-con**.
3. Click the **SPM.mat** file from. ->Done.
4. Click the 'inc-con' contrast. -> Done
5. for 'apply masking', select 'image', then load the 'Ana-ACC.nii' image you created using the WFU_PickAtlas toolbox
6. Choose 'inclusive' for the nature of the mask
7. Select 'No' for ROI Analysis
8. 'none' for the p-value adjustment and type '1' for the threshold {T or p value}
9. '0' for & extent threshold {voxels} -> Enter

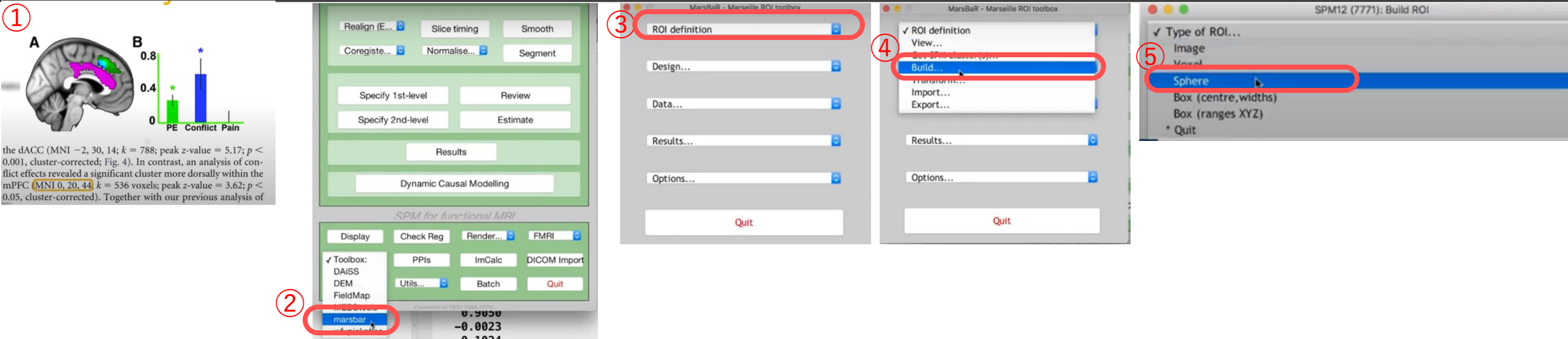


マスクからデータを抽出する/Extracting Data from Mask



1. Right click in any of the glass brain panels and select 'goto global maximum'.
2. Right-click again, and select 'Extract data' -> 'whitened and filtered y' -> 'This cluster'.
3. type the $Inc-Con = mean(y,2)$ on Matlab terminal -> Enter

Marsbarを用いて機能的ROIマスクを作成する / Create Functional ROI Mask using Marsbar¹⁴



1. Select ROI coordinates from literature that used the same experimental design./同じ実験デザインを使用した文献からROI座標を選択する.
2. From the SPM GUI, click on Toolbox -> **marsbar**
3. Click on 'ROI definition'
4. Click on '**Build**'
5. From the 'Type of ROI' dropdown menu, select **Sphere**

Marsbarを用いて機能的ROIマスクを作成する / Create Functional ROI Mask using Marsbar¹⁵

SPM12 (7771): Build ROI

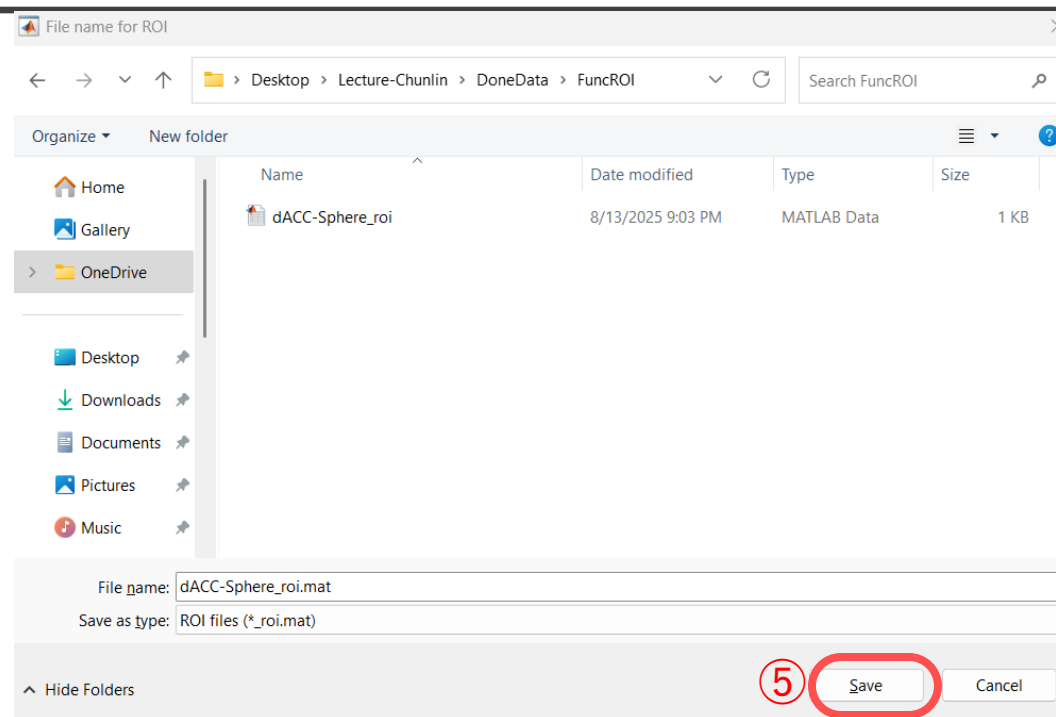
Sphere

[3] Centre of sphere (mm) ① 0 20 44

Sphere radius (mm) ② 5

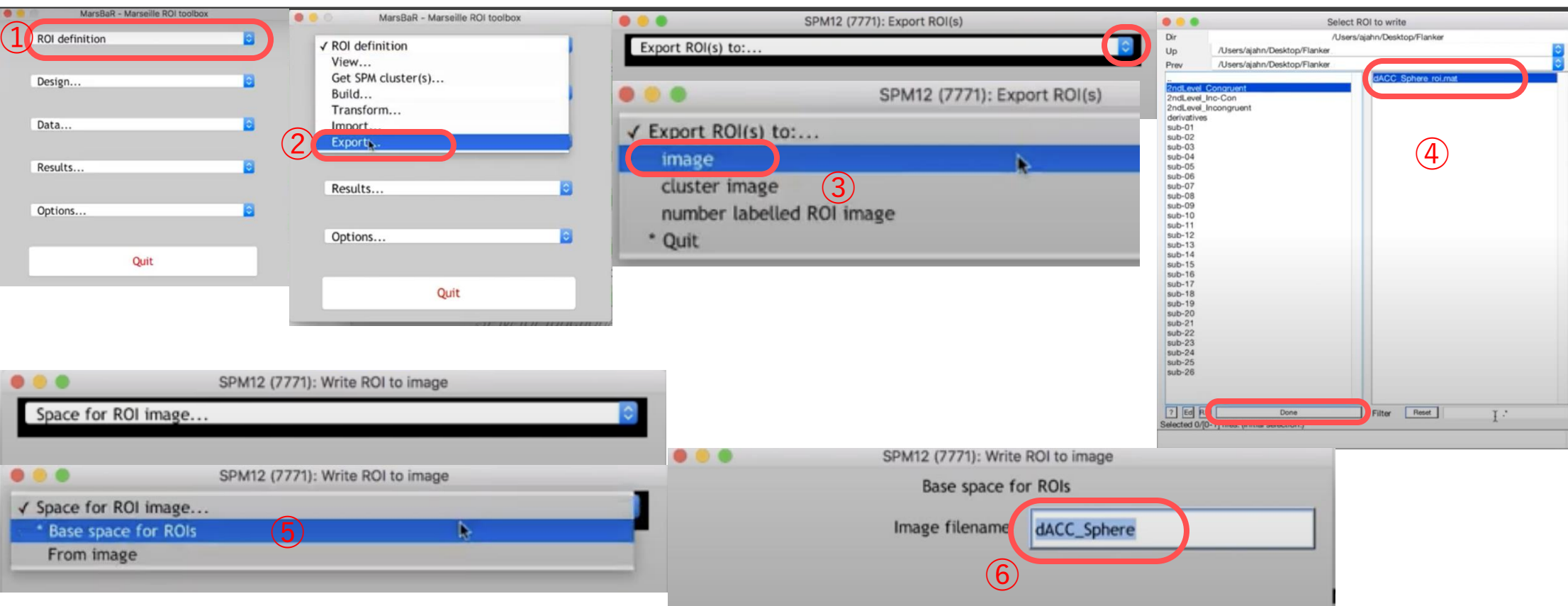
Description of ROI ③ dACC_Sphere

Label for ROI ④ dACC_Sphere



1. Center of sphere: enter the coordinates '0 20 44'.
2. Enter a Sphere radius of '5'.
3. Description of ROI: dACC_Sphere
4. Label for ROI: dACC_Sphere.
5. Save the created mat.file to your desired directory as 'dACC_Sphere_roi'.

Marsbarを用いて機能的ROIマスクを作成する / Create Functional ROI Mask using Marsbar¹⁶



1. Go back to the marsbar ROI and select **ROI definition**.
2. Click on '**Export**'.
3. In the Export ROI(s) to dropdown menu, select '**image**'.
4. Click on the dACC_Sphere_roi.mat file -> Done
5. Leave the Space for ROI image as the default (i.e., **Base space for ROIs**),
6. Select output folder. Label the image as **dACC_Sphere**.
7. Use the same method as for anatomical mask extraction to extract data.