



wwPDB EM Validation Summary Report ⓘ

Jul 15, 2024 – 10:35 pm BST

PDB ID : 8B59
EMDB ID : EMD-15859
Title : Rosellinia necatrix megabirnavirus 1-W779 Crown protein
Authors : Wang, H.; Okamoto, K.; Miyazaki, N.; Suzuki, N.
Deposited on : 2022-09-22
Resolution : 3.30 Å (reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev92
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

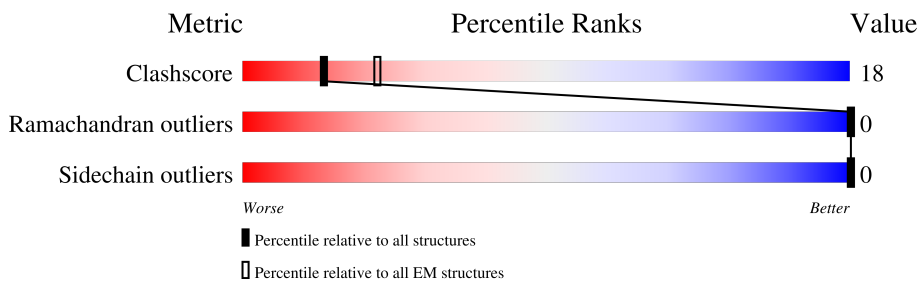
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	C	1426	91%
1	D	1426	91%
1	E	1426	91%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 2988 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called RnMBV1 Crown protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	D	135	Total 996	628	175	186	7	0	0
1	E	135	Total 996	628	175	186	7	0	0
1	C	135	Total 996	628	175	186	7	0	0

M1321	VAL	ASP	GLY	THR	ALA
M1322	GLY	SER	THR	GLY	THR
V1323	VAL	ASP	GLY	THR	ALA
W1324	GLY	ASP	GLY	THR	ALA
R1325	PHE	ASP	GLY	THR	ALA
D1326	ALA	ASP	GLY	THR	ALA
A1327	ALA	PRO	GLN	GLY	THR
V1328	PRO	GLY	GLN	GLY	THR
I1329	GLY	LEU	GLY	THR	ALA
D1330	SER	PRO	ASN	LEU	GLY
V1331	ASP	PRO	ASN	LEU	GLY
M1332	MET	GLY	GLY	THR	ALA
R1333	LEU	LEU	VAL	THR	ALA
D1399	LEU	LEU	VAL	THR	ALA
L1400	ASP	PRO	THR	GLY	THR
K1401	GLN	VAL	THR	VAL	THR
M1339	ALA	LEU	GLY	THR	ALA
G1342	PRO	VAL	THR	GLY	THR
K1343	GLY	SER	VAL	THR	ALA
Y1344	ALA	VAL	VAL	THR	ALA
G1345	THR	ASP	SER	THR	ALA
R1346	GLY	GLN	THR	VAL	THR
I1347	SER	LEU	THR	THR	ALA
D1348	LEU	SER	THR	THR	ALA
D1349	PRO	GLY	THR	THR	ALA
G1410	PHE	VAL	THR	THR	ALA
I1350	GLY	PRO	SER	GLY	THR
A1411	VAL	THR	THR	THR	ALA
A1351	ILE	VAL	THR	THR	ALA
A1352	THR	THR	GLY	THR	ALA
M1353	GLN	THR	THR	THR	ALA
R1354	VAL	THR	THR	THR	ALA
L1357	L1293	Y1293	Y1293	Y1293	Y1293
M1358	M1295	A1294	A1294	A1294	A1294
D1359	M1296	M1295	M1295	M1295	M1295
G1360	V1297	A1296	A1296	A1296	A1296
A11298	A1297	M1297	M1297	M1297	M1297
I1299	I1298	A1298	A1298	A1298	A1298
G1300	G1300	I1299	I1299	I1299	I1299
G1301	G1301	G1300	G1300	G1300	G1300
S1302	S1302	G1301	G1301	G1301	G1301
L1303	L1303	S1302	S1302	S1302	S1302
G1304	G1304	L1303	L1303	L1303	L1303
S1305	S1305	G1304	G1304	G1304	G1304
Q1306	Q1306	S1305	S1305	S1305	S1305
L1307	L1307	Q1306	Q1306	Q1306	Q1306
S1308	S1308	L1307	L1307	L1307	L1307
E1309	E1309	S1308	S1308	S1308	S1308
A1310	A1310	E1309	E1309	E1309	E1309
Q1311	Q1311	A1310	A1310	A1310	A1310
V1312	V1312	Q1311	Q1311	Q1311	Q1311
S1313	S1313	V1312	V1312	V1312	V1312
A1314	A1314	S1313	S1313	S1313	S1313
A1315	A1315	A1314	A1314	A1314	A1314
R1316	R1316	A1315	A1315	A1315	A1315
V1317	V1317	R1316	R1316	R1316	R1316
V1318	V1318	V1317	V1317	V1317	V1317
L1319	L1319	V1318	V1318	V1318	V1318
G1320	G1320	L1319	L1319	L1319	L1319
M1321	VAL	ASP	GLY	THR	ALA
L1387	VAL	ASP	GLY	THR	ALA
L1388	VAL	SER	THR	GLY	THR
R1389	VAL	SER	THR	GLY	THR
F1391	GLY	THR	GLY	THR	ALA
S1392	PHE	THR	GLY	THR	ALA
S1393	ALA	THR	GLY	THR	ALA
T1394	PRO	THR	GLY	THR	ALA
M1395	GLY	PRO	GLN	GLY	THR
V1396	SER	PRO	ASN	LEU	GLY
G1397	ASP	PRO	ASN	LEU	GLY
V1398	MET	GLY	GLY	THR	ALA
D1399	LEU	LEU	VAL	THR	ALA
L1400	LEU	LEU	VAL	THR	ALA
K1401	THR	THR	VAL	THR	ALA
I1402	GLY	THR	VAL	THR	ALA
Q1403	GLY	THR	VAL	THR	ALA
M1404	VAL	THR	VAL	THR	ALA
L1405	THR	ASP	SER	THR	ALA
V1406	GLY	GLN	THR	VAL	THR
E1407	SER	LEU	THR	THR	ALA
L1408	LEU	SER	THR	THR	ALA
Y1409	PRO	GLY	THR	THR	ALA
G1410	PHE	VAL	THR	THR	ALA
M1411	GLY	PRO	SER	GLY	THR
E1412	VAL	THR	THR	THR	ALA
P1413	THR	THR	THR	THR	ALA
A1414	VAL	THR	THR	THR	ALA
T1415	L1357	L1357	L1357	L1357	L1357
A1416	M1358	M1358	M1358	M1358	M1358
A1417	D1359	D1359	D1359	D1359	D1359
L1418	G1360	G1360	G1360	G1360	G1360
L1419	T1361	T1361	T1361	T1361	T1361
Y1420	G1362	G1362	G1362	G1362	G1362
G1422	L1363	L1363	L1363	L1363	L1363
W1423	L1364	L1364	L1364	L1364	L1364
T1424	P1365	P1365	P1365	P1365	P1365
M1425	G1366	G1366	G1366	G1366	G1366
Q1426	S1367	S1367	S1367	S1367	S1367
E1368	E1368	E1368	E1368	E1368	E1368
P1369	P1369	P1369	P1369	P1369	P1369
I1370	I1370	I1370	I1370	I1370	I1370
V1371	V1371	V1371	V1371	V1371	V1371
D1372	D1372	D1372	D1372	D1372	D1372
V1373	V1373	V1373	V1373	V1373	V1373
G1374	G1374	G1374	G1374	G1374	G1374
G1375	G1375	G1375	G1375	G1375	G1375
A1376	A1376	A1376	A1376	A1376	A1376
E1377	E1377	E1377	E1377	E1377	E1377
G1378	G1378	G1378	G1378	G1378	G1378
M1379	M1379	M1379	M1379	M1379	M1379
A1380	A1380	A1380	A1380	A1380	A1380
C1381	C1381	C1381	C1381	C1381	C1381
A1382	A1382	A1382	A1382	A1382	A1382
R1383	R1383	R1383	R1383	R1383	R1383
A1384	A1384	A1384	A1384	A1384	A1384
T1385	T1385	T1385	T1385	T1385	T1385
I1386	I1386	I1386	I1386	I1386	I1386

● Molecule 1: RnMBV1 Crown protein



VAL	ASP	VAL	M1321	I1386	VAL	ASP	M1322	L1387	VAL	ASP	M1323	L1388	VAL	ASP	M1324	R1389	VAL	ASP	M1325	G1390	VAL	ASP	M1326	F1391	VAL	ASP	M1327	S1392	VAL	ASP	M1328	S1393	VAL	ASP	M1329	T1394	VAL	ASP	M1330	M1395	VAL	ASP	M1331	V1396	VAL	ASP	M1332	G1397	VAL	ASP	M1333	V1398	VAL	ASP	M1334	D1399	VAL	ASP	M1335	L1400	VAL	ASP	M1336	L1401	VAL	ASP	M1337	I1402	VAL	ASP	M1338	Q1403	VAL	ASP	M1339	M1404	VAL	ASP	M1340	L1405	VAL	ASP	M1341	V1406	VAL	ASP	M1342	E1407	VAL	ASP	M1343	L1408	VAL	ASP	M1344	Y1409	VAL	ASP	M1345	G1410	VAL	ASP	M1346	A1410	VAL	ASP	M1347	A1411	VAL	ASP	M1348	E1412	VAL	ASP	M1349	P1413	VAL	ASP	M1350	A1414	VAL	ASP	M1351	T1415	VAL	ASP	M1352	A1416	VAL	ASP	M1353	A1417	VAL	ASP	M1354	L1418	VAL	ASP	M1355	L1419	VAL	ASP	M1356	Y1420	VAL	ASP	M1357	R1421	VAL	ASP	M1358	G1422	VAL	ASP	M1359	W1423	VAL	ASP	M1360	T1424	VAL	ASP	M1361	M1425	VAL	ASP	M1362	Q1426	VAL	ASP	M1363		VAL	ASP	M1364		VAL	ASP	M1365		VAL	ASP	M1366		VAL	ASP	M1367		VAL	ASP	M1368		VAL	ASP	M1369		VAL	ASP	M1370		VAL	ASP	M1371		VAL	ASP	M1372		VAL	ASP	M1373		VAL	ASP	M1374		VAL	ASP	M1375		VAL	ASP	M1376		VAL	ASP	M1377		VAL	ASP	M1378		VAL	ASP	M1379		VAL	ASP	M1380		VAL	ASP	M1381		VAL	ASP	M1382		VAL	ASP	M1383		VAL	ASP	M1384		VAL	ASP	M1385	
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	244609	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	48	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2750	Depositor
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.463	Depositor
Minimum map value	-0.330	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.030	Depositor
Recommended contour level	0.134	Depositor
Map size (\AA)	649.6, 649.6, 649.6	wwPDB
Map dimensions	580, 580, 580	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.12, 1.12, 1.12	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	C	0.29	0/1010	0.48	0/1366
1	D	0.29	0/1010	0.48	0/1366
1	E	0.29	0/1010	0.48	0/1366
All	All	0.29	0/3030	0.48	0/4098

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	996	0	1010	58	0
1	D	996	0	1010	57	0
1	E	996	0	1010	58	0
All	All	2988	0	3030	109	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 18.

The worst 5 of 109 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1322:GLY:O	1:C:1426:GLN:HG3	1.66	0.95

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1426:GLN:HG3	1:E:1322:GLY:O	1.66	0.94
1:E:1423:TRP:HE1	1:C:1358:ASN:HB3	1.32	0.93
1:E:1426:GLN:NE2	1:C:1321:ASN:O	2.02	0.93
1:D:1426:GLN:NE2	1:E:1321:ASN:O	2.02	0.92

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	133/1426 (9%)	117 (88%)	16 (12%)	0	100	100
1	D	133/1426 (9%)	117 (88%)	16 (12%)	0	100	100
1	E	133/1426 (9%)	117 (88%)	16 (12%)	0	100	100
All	All	399/4278 (9%)	351 (88%)	48 (12%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	100/1103 (9%)	100 (100%)	0	100	100
1	D	100/1103 (9%)	100 (100%)	0	100	100
1	E	100/1103 (9%)	100 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	300/3309 (9%)	300 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

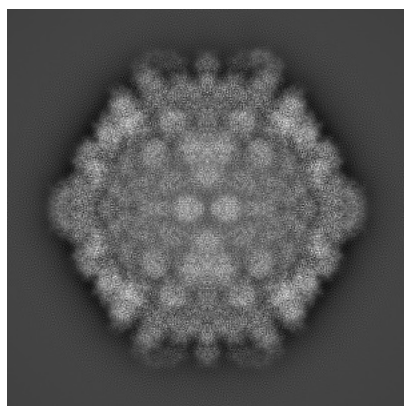
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-15859. These allow visual inspection of the internal detail of the map and identification of artifacts.

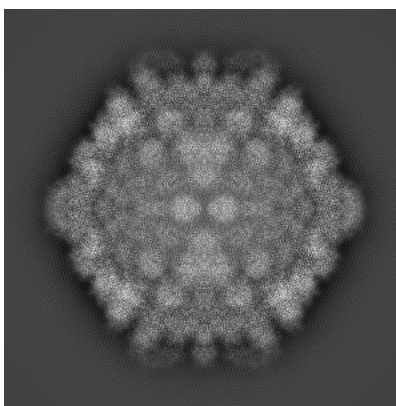
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

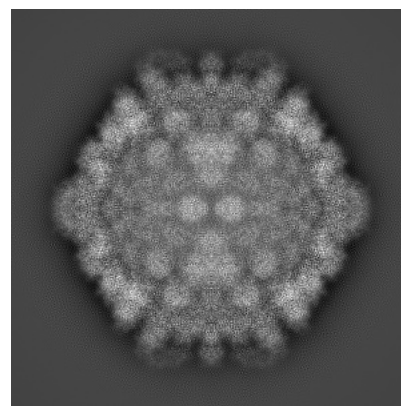
6.1.1 Primary map



X

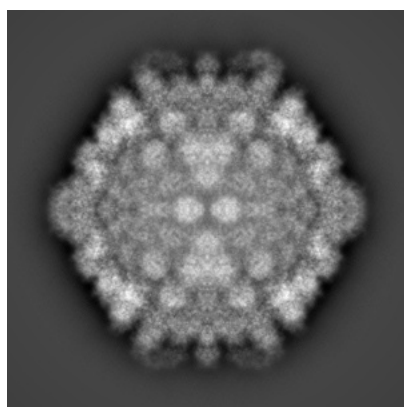


Y

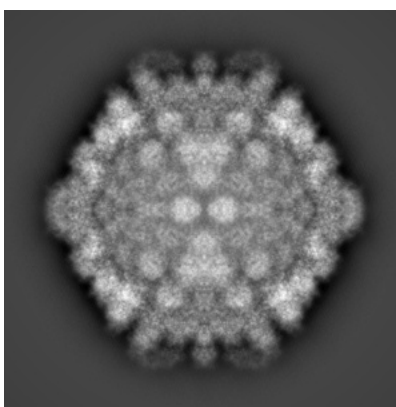


Z

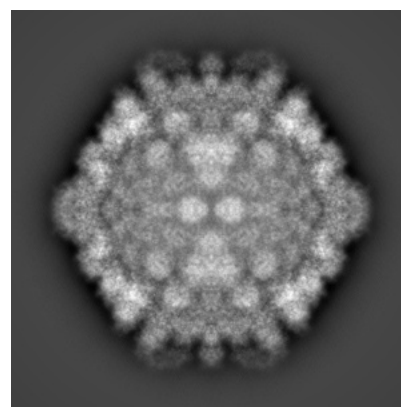
6.1.2 Raw map



X



Y

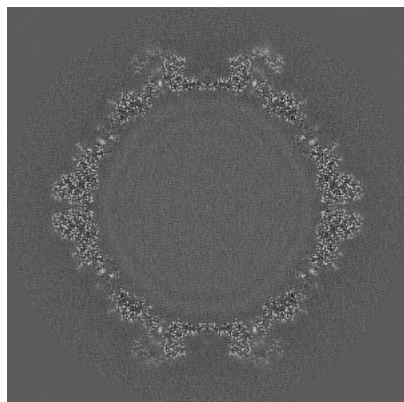


Z

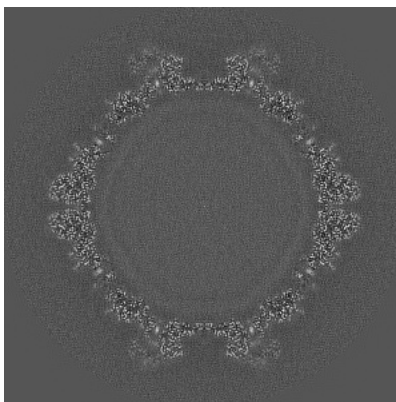
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

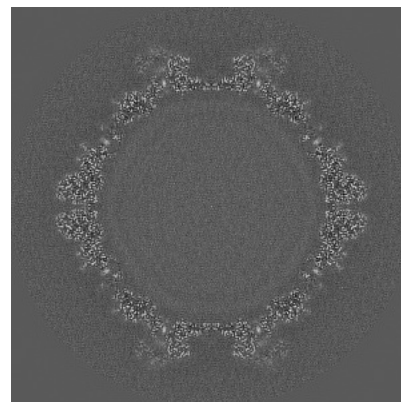
6.2.1 Primary map



X Index: 290

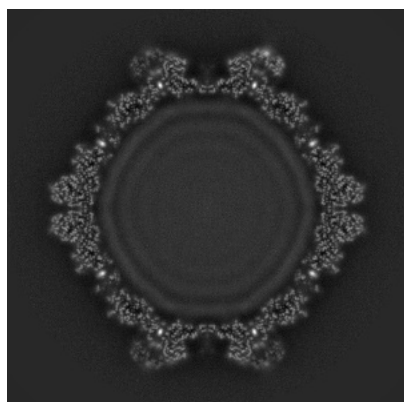


Y Index: 290

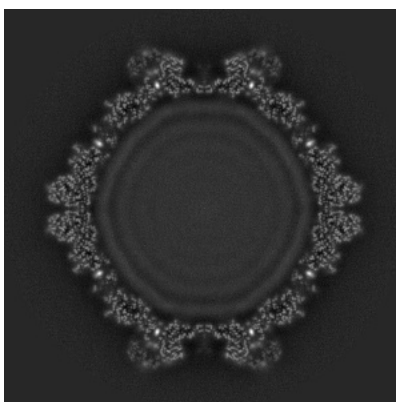


Z Index: 290

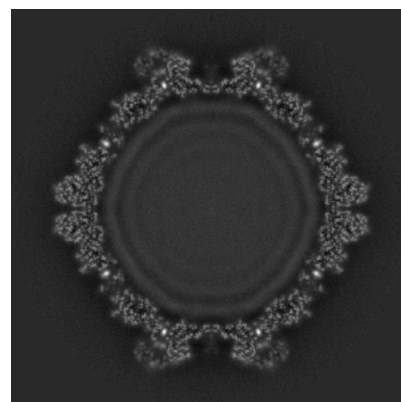
6.2.2 Raw map



X Index: 290



Y Index: 290

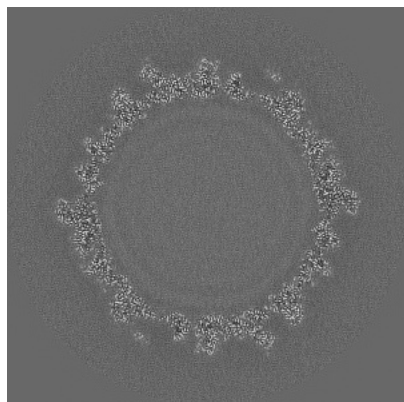


Z Index: 290

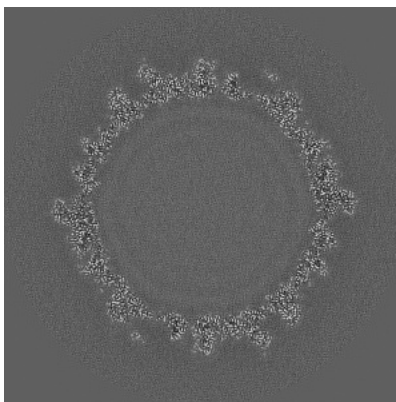
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

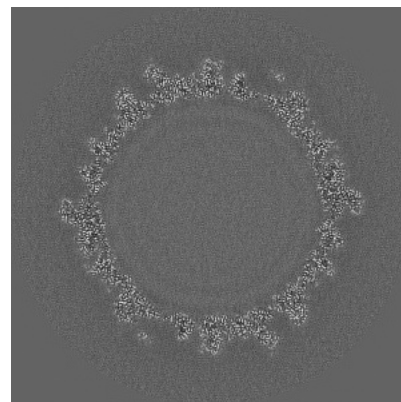
6.3.1 Primary map



X Index: 330

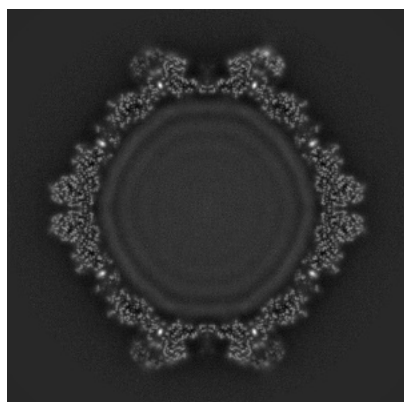


Y Index: 330

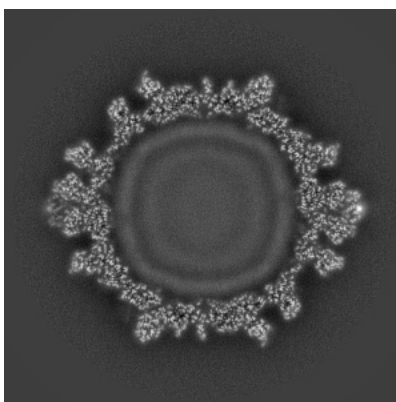


Z Index: 330

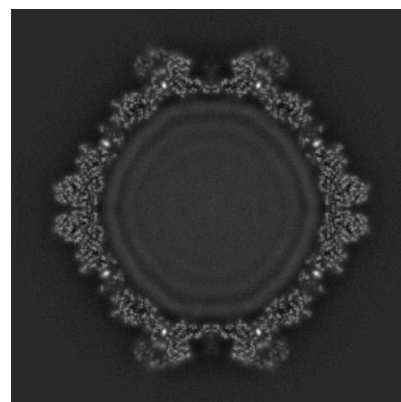
6.3.2 Raw map



X Index: 290



Y Index: 376

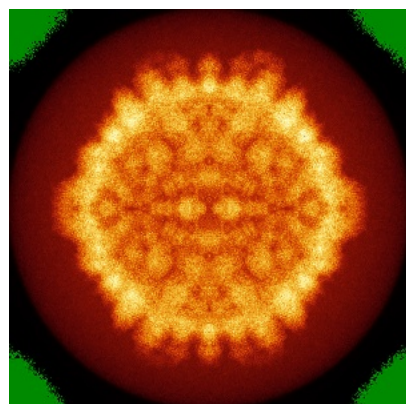


Z Index: 290

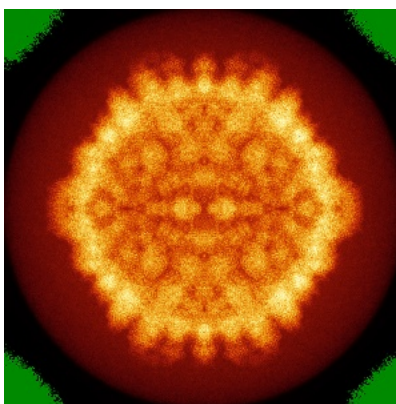
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

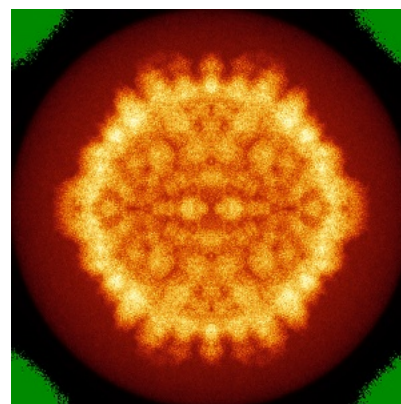
6.4.1 Primary map



X

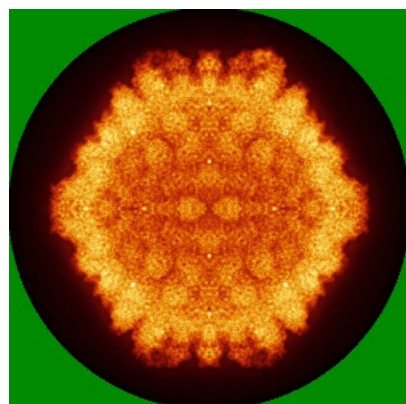


Y

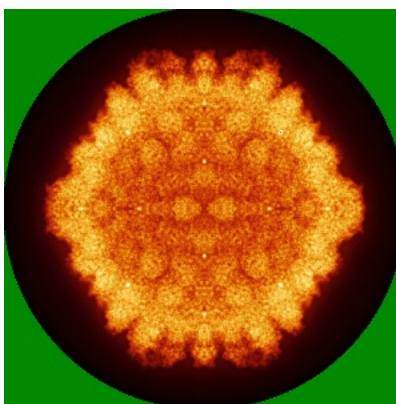


Z

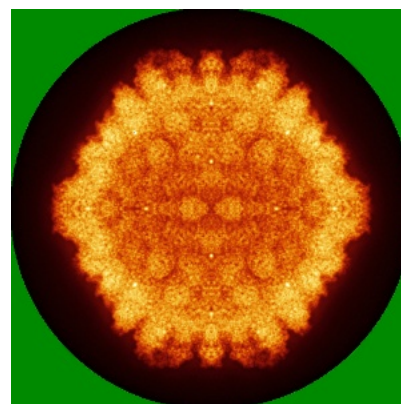
6.4.2 Raw map



X



Y

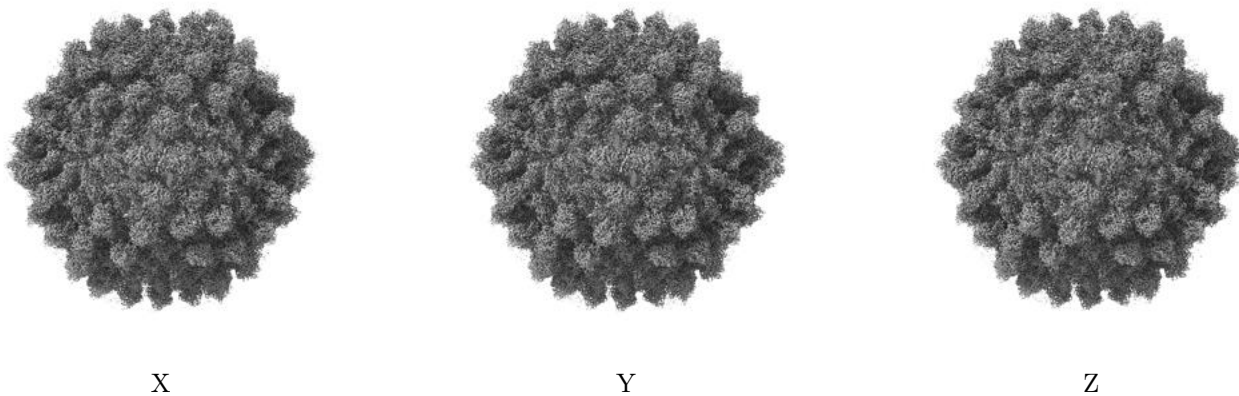


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

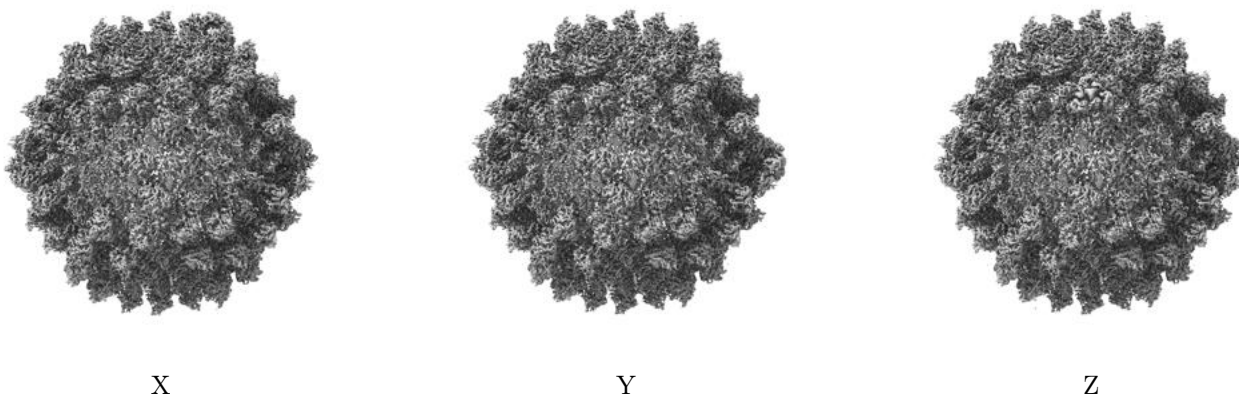
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.134. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

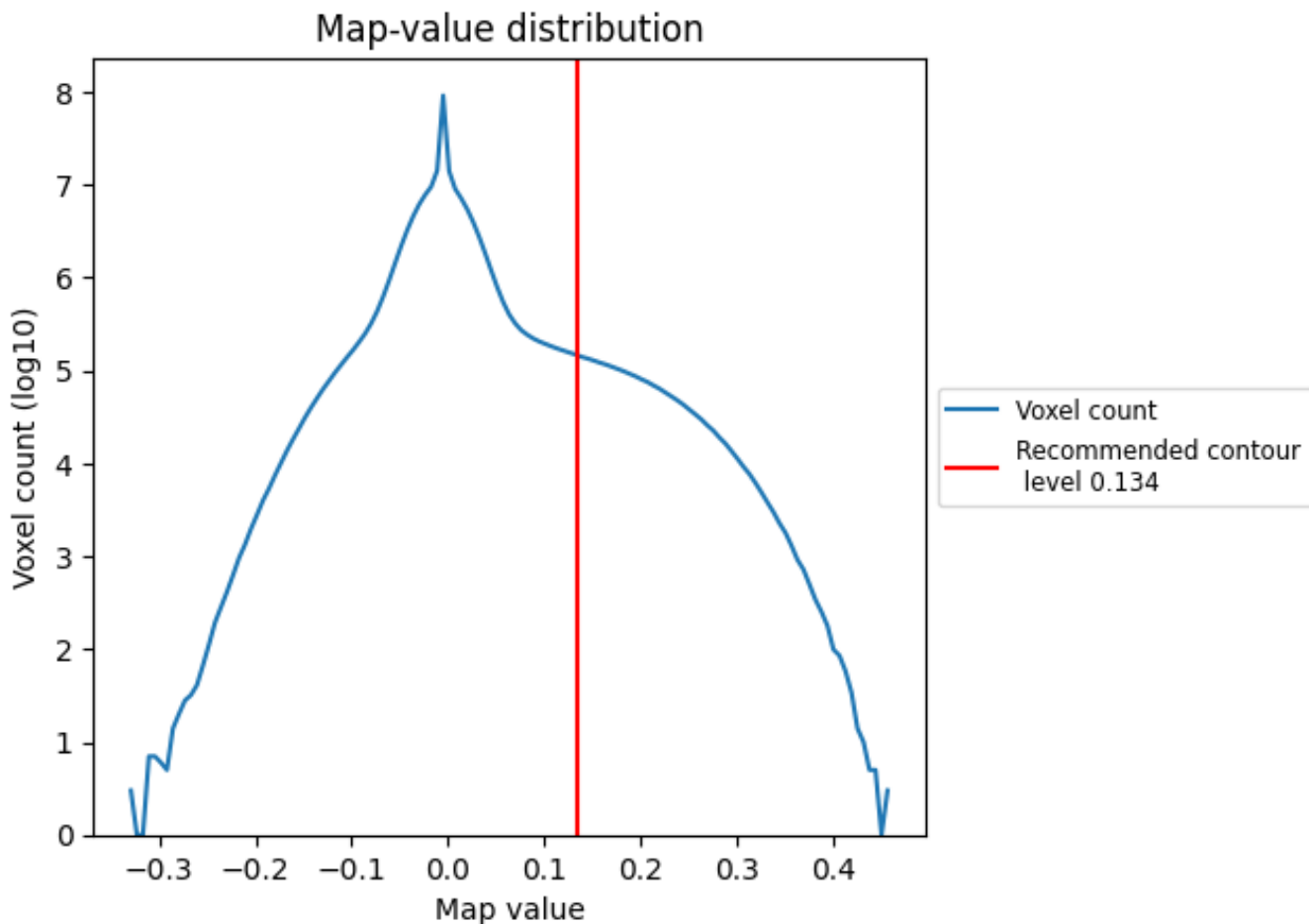
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

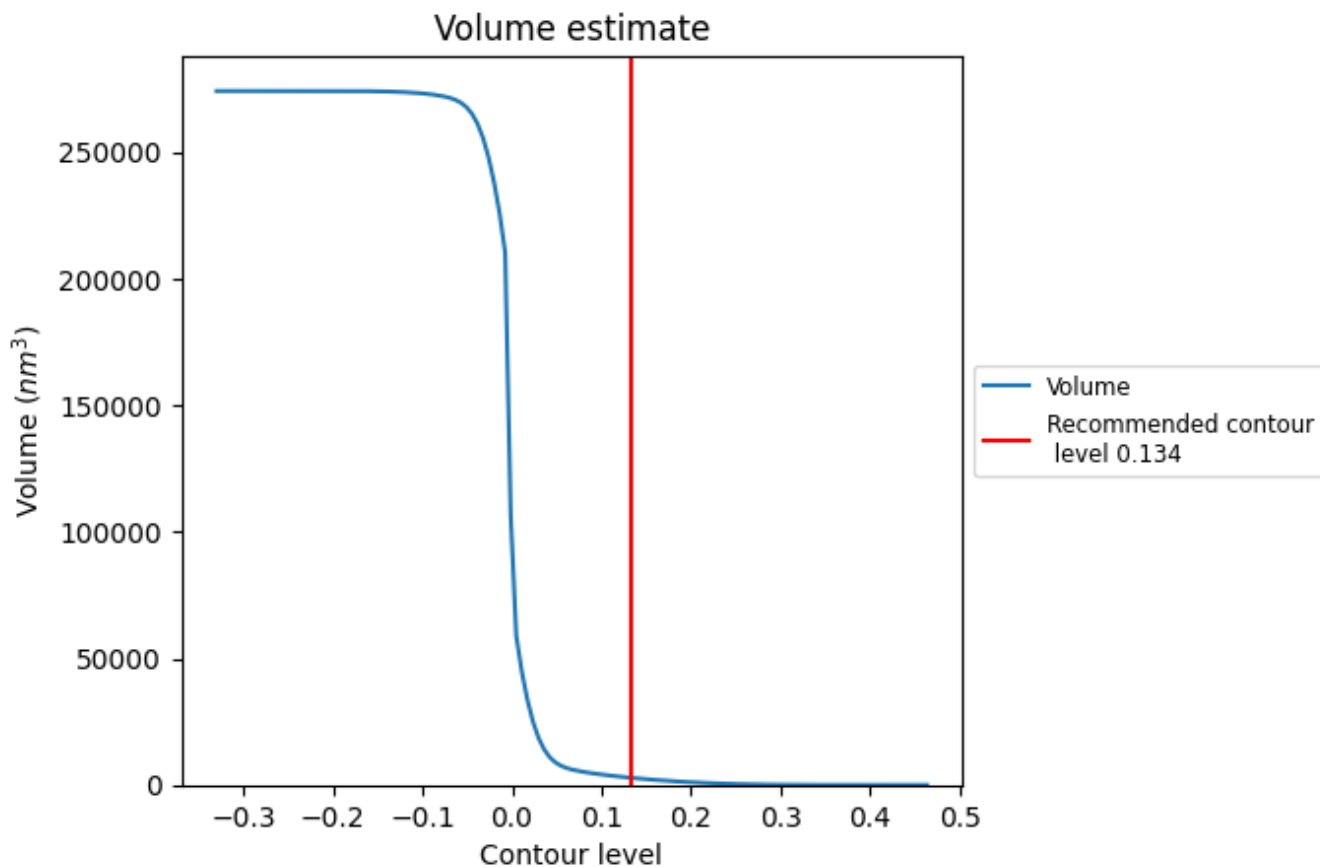
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

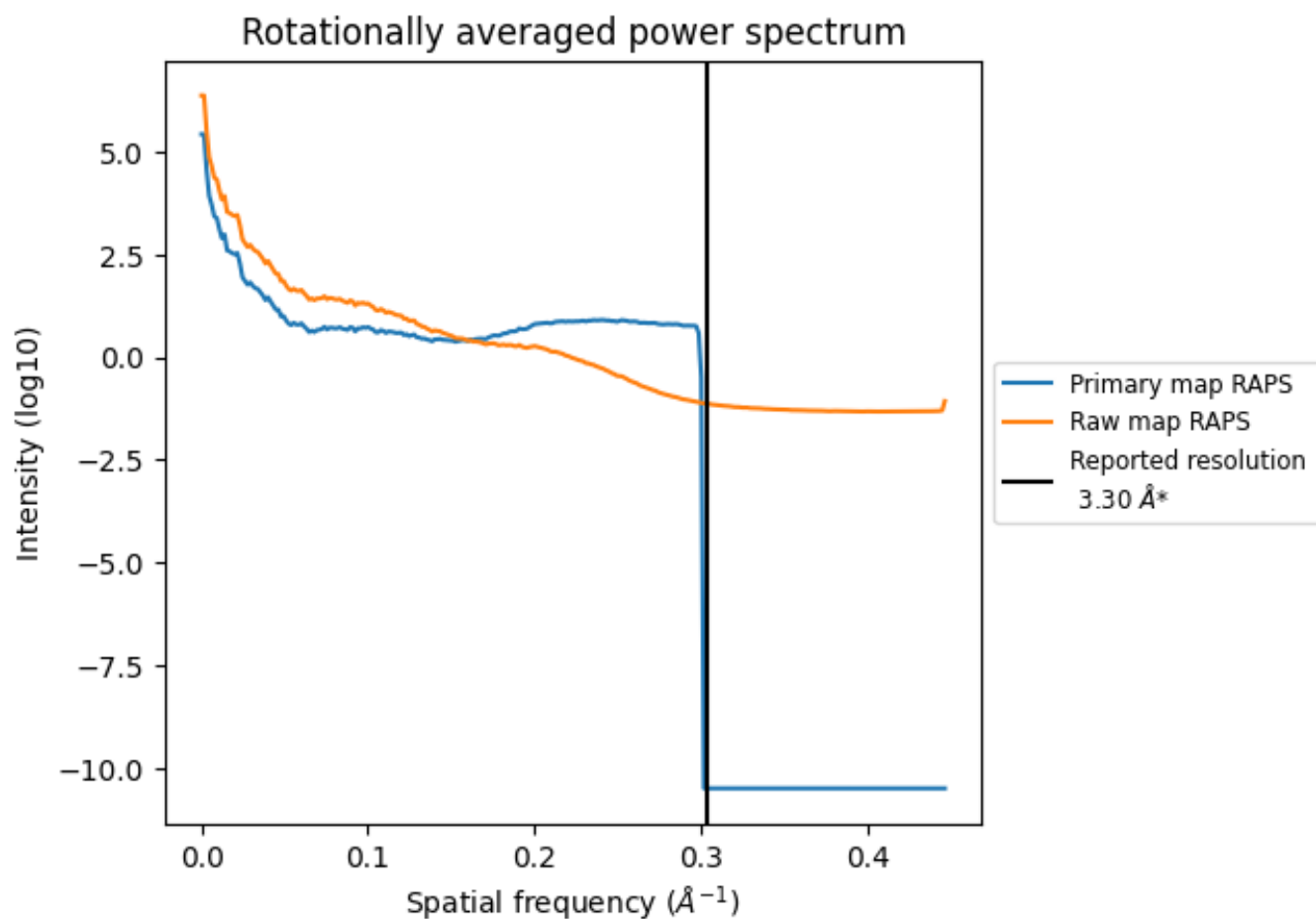
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2791 nm³; this corresponds to an approximate mass of 2521 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum [i](#)

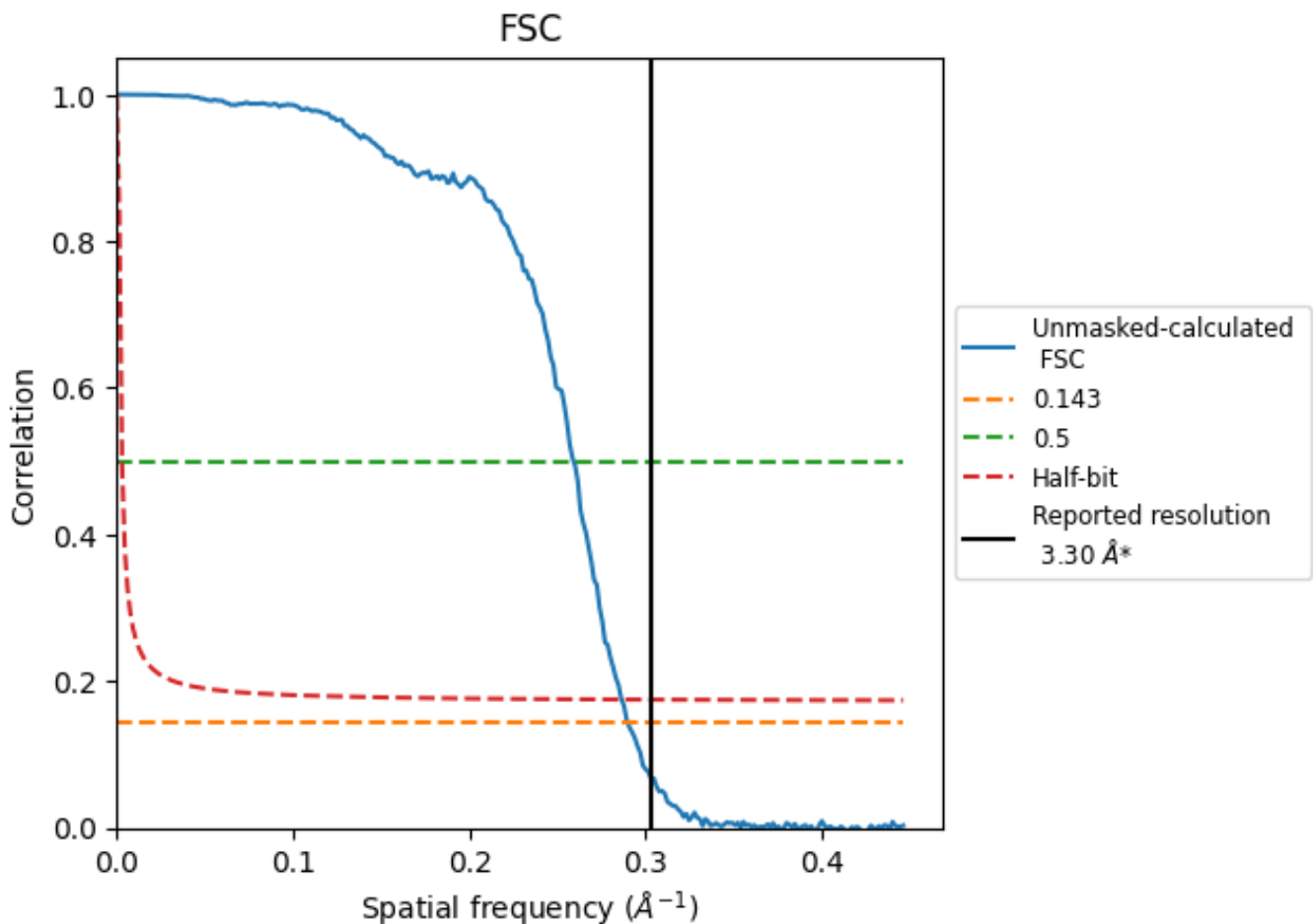


*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.45	3.86	3.49

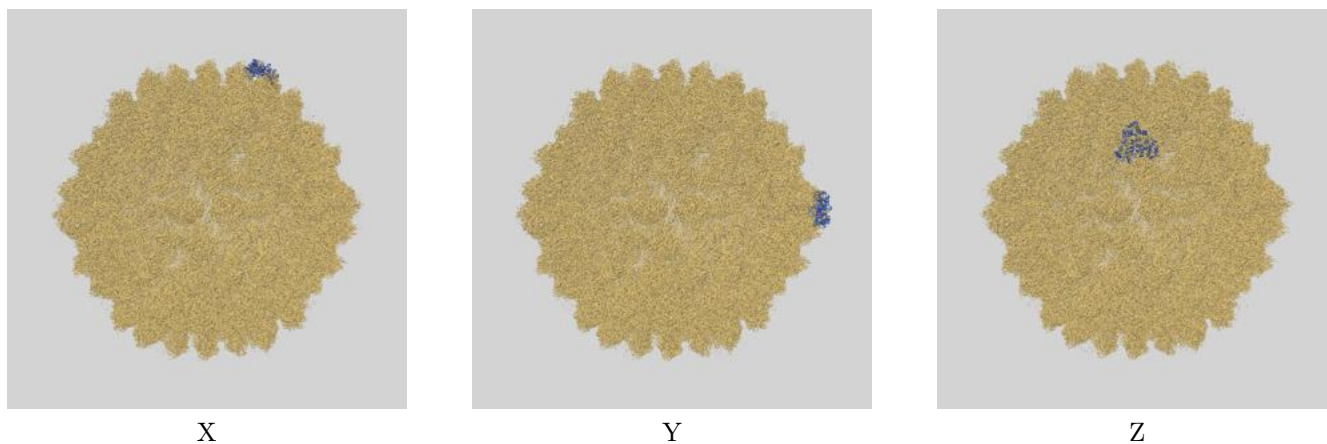
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

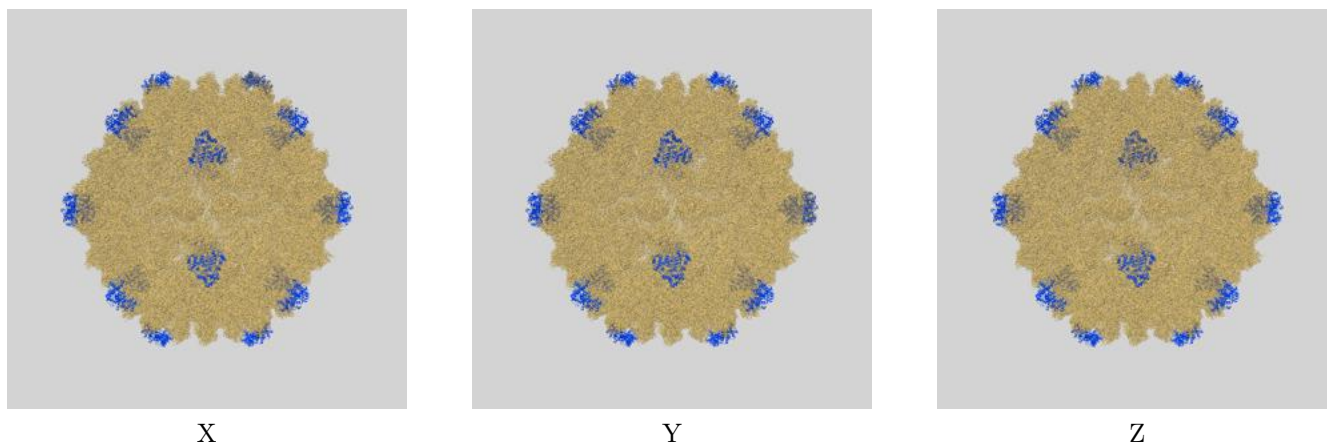
This section contains information regarding the fit between EMDB map EMD-15859 and PDB model 8B59. Per-residue inclusion information can be found in section 3 on page 4.

9.1 Map-model overlays

9.1.1 Map-model overlay [i](#)

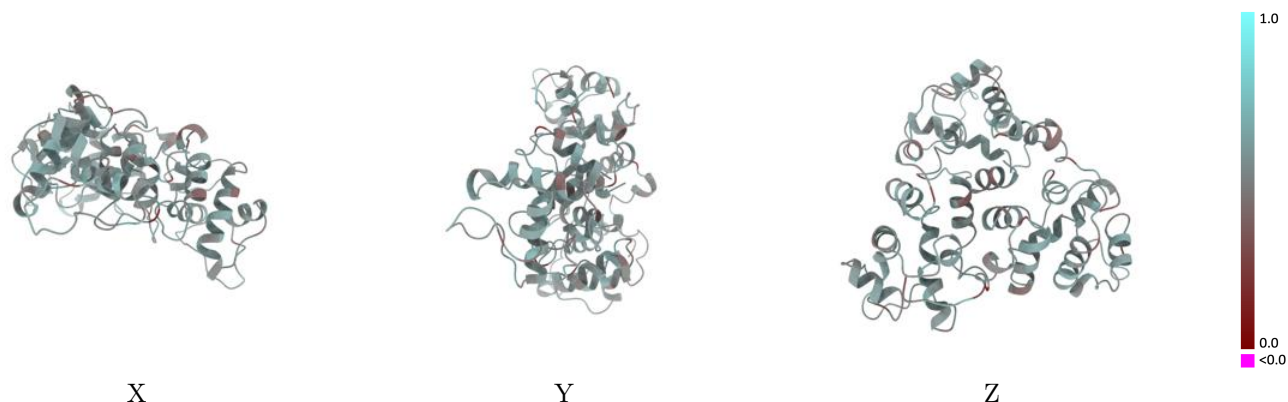


9.1.2 Map-model assembly overlay [i](#)



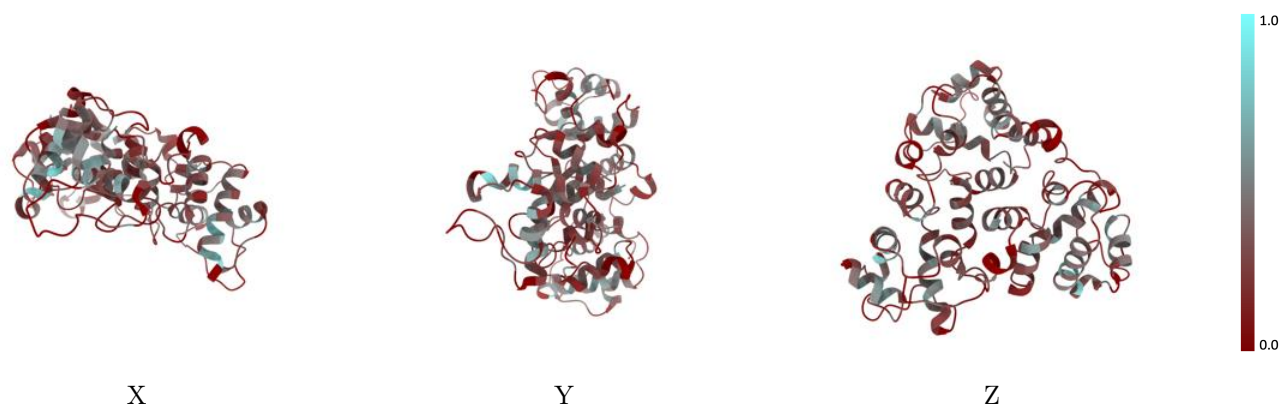
The images above show the 3D surface view of the map at the recommended contour level 0.134 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



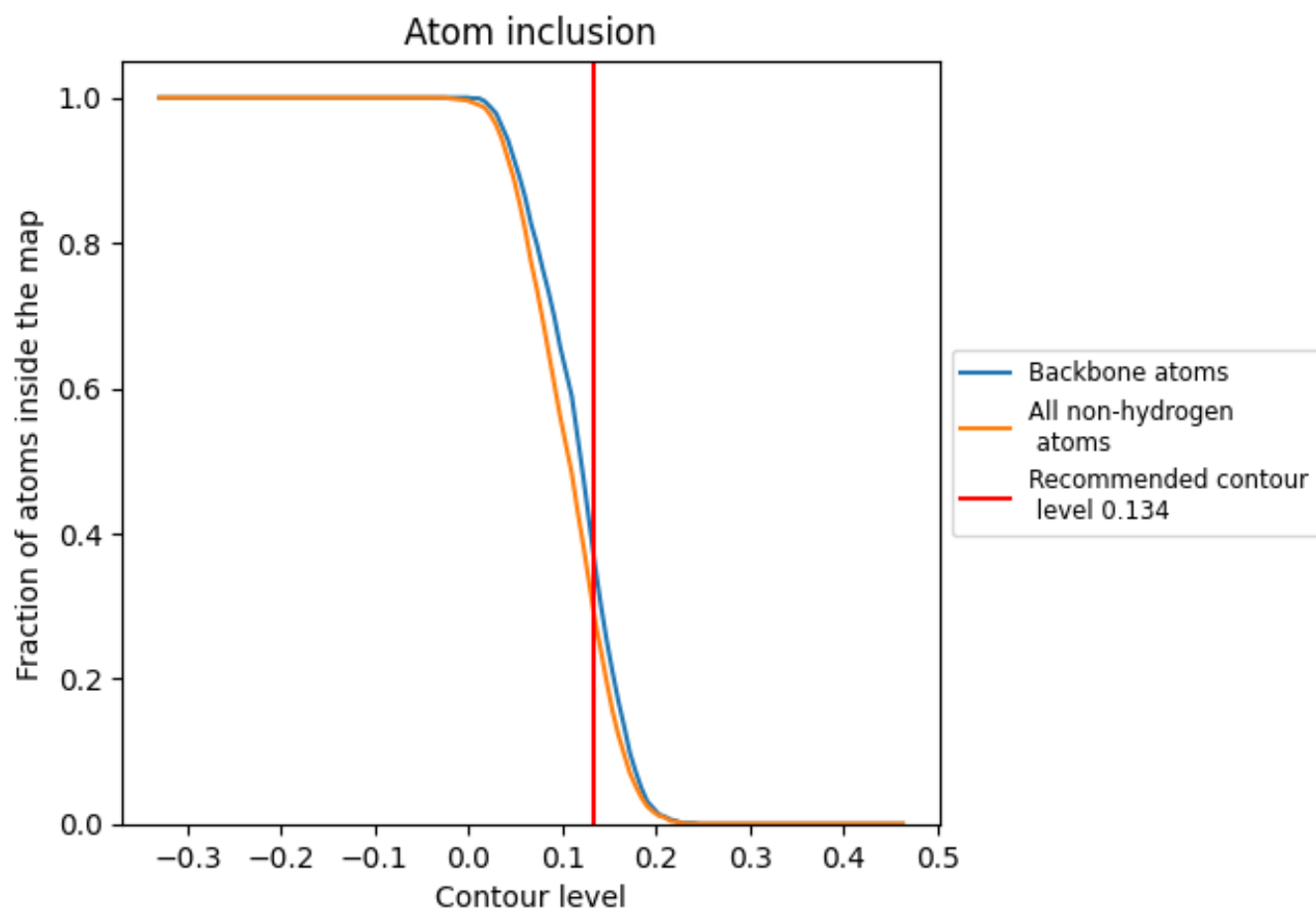
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.134).









9.4 Atom inclusion [i](#)



At the recommended contour level, 37% of all backbone atoms, 29% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.134) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.2890	 0.5290
C	 0.2860	 0.5270
D	 0.2870	 0.5300
E	 0.2940	 0.5290

