



# wwPDB EM Validation Summary Report ⓘ

Mar 13, 2024 – 12:49 PM JST

PDB ID : 3J28  
EMDB ID : EMD-5500  
Title : Dissecting the in vivo assembly of the 30S ribosomal subunit reveals the role of RimM  
Authors : Guo, Q.; Goto, S.; Chen, Y.; Muto, A.; Himeno, H.; Deng, H.; Lei, J.; Gao, N.  
Deposited on : 2012-09-28  
Resolution : 12.90 Å (reported)  
Based on initial model : 3OFA

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev70  
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) : 2.36

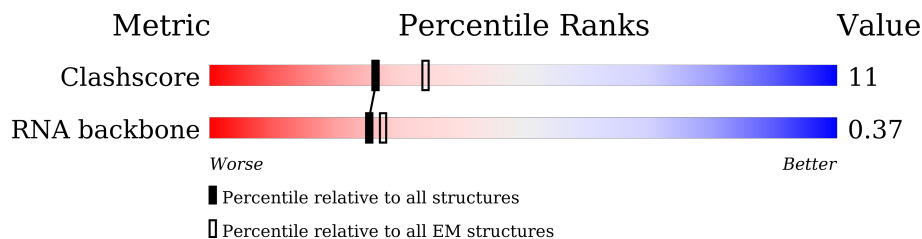
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 12.90 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
RNA backbone	4643	859

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  $\geq 3$ , 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	N	1533	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 49446 atoms, of which 16554 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.

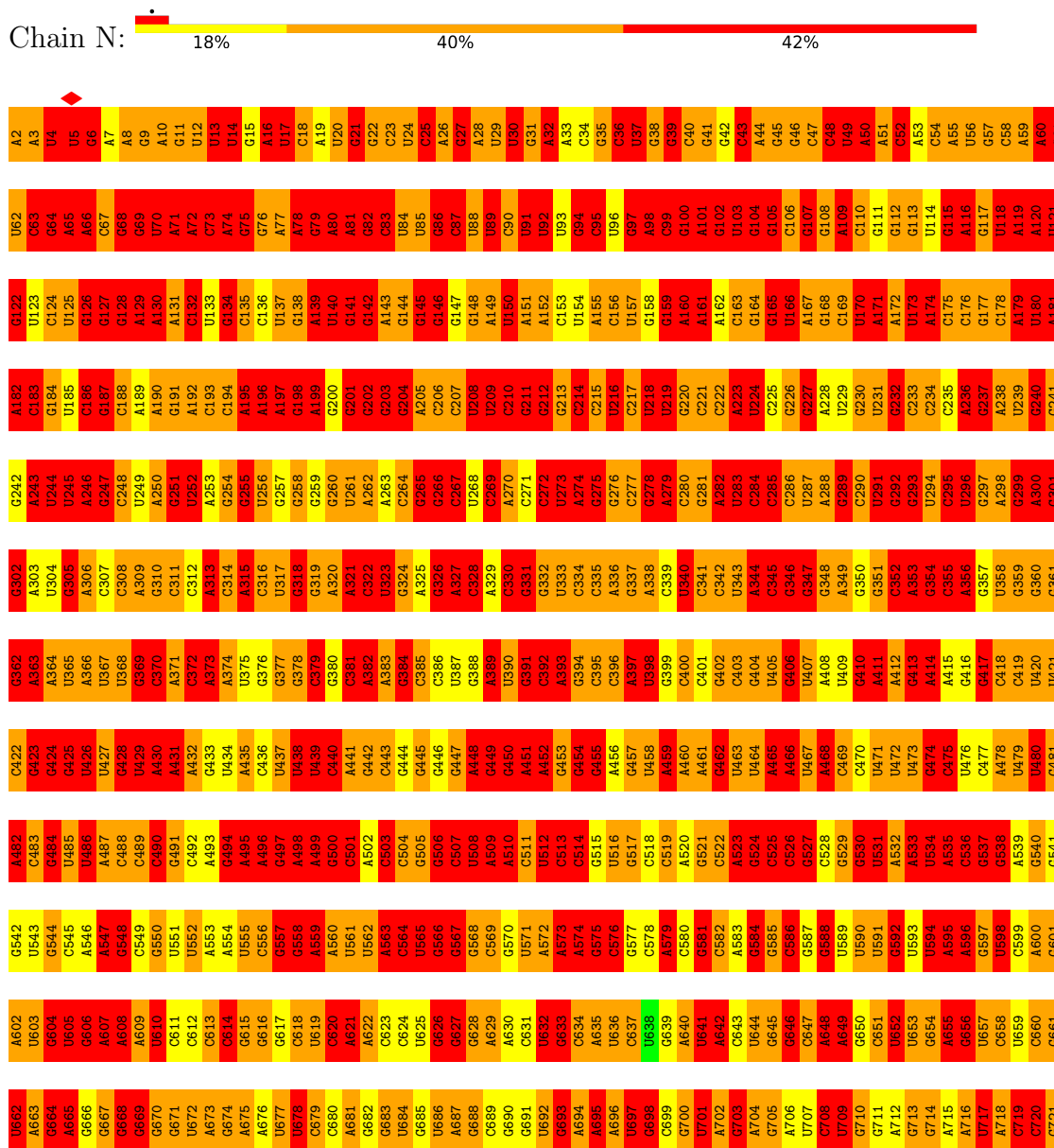
- Molecule 1 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
1	N	1533	49446	14671	16554	6036	10653	1532	0	0

### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: 16S rRNA



A1502	A1503	A1504	G1505	A1506	A1507	A1508	A1509	C1510	G1511	G1512	A1513	G1514	G1515	G1516	G1517	A1518	A1519	C1520	C1521	G1522	G1523	G1524	G1525	G1526	G1527	G1528	G1529	G1530	A1531	G1532	G1533	A1534																																															
G1442	C1443	G1444	G1445	A1446	A1447	C1448	C1449	G1450	G1451	G1452	G1453	G1454	G1455	A1456	G1457	G1458	G1459	C1460	C1461	G1462	G1463	A1464	A1465	G1466	A1467	A1468	G1469	G1470	G1471	G1472	G1473	G1474	G1475	A1476	G1477	G1478	G1479	A1480	G1481	G1482	C1483	C1484	G1485	G1486	G1487	G1488	G1489	G1490	G1491	A1492	A1493	G1494	G1495	G1496	G1497	G1498	A1499	A1500	C1501																				
C1382	C1383	C1384	G1385	G1386	G1387	C1388	C1389	G1390	G1391	G1392	G1393	C1394	G1395	C1396	C1397	C1398	C1399	C1400	G1401	C1402	C1403	C1404	G1405	A1406	C1407	C1408	C1409	A1410	C1411	C1412	A1413	G1414	G1415	G1416	G1417	A1418	G1419	G1420	G1421	G1422	G1423	G1424	G1425	G1426	G1427	A1428	A1429	A1430	A1431	G1432	A1433	A1434	G1435	G1436	G1437	G1438	G1439	G1440	A1441																				
C1322	G1323	A1324	C1325	G1326	C1327	C1328	A1329	G1330	G1331	A1332	G1333	G1334	G1335	C1336	G1337	G1338	G1339	A1340	G1341	C1342	G1343	C1344	G1345	A1346	G1347	A1348	A1349	C1350	G1351	C1352	G1353	G1354	G1355	G1356	A1357	G1358	C1359	A1360	G1361	A1362	A1363	G1364	G1365	C1366	C1367	A1368	C1369	G1370	G1371	G1372	A1373	A1374	A1375	G1376	A1377	C1378	G1379	G1380	G1381																				
C1262	C1263	A1264	C1265	G1266	C1267	G1268	A1269	G1270	A1271	G1272	C1273	A1274	G1275	G1276	C1277	G1278	A1279	A1280	C1281	C1282	C1283	C1284	A1285	G1286	A1287	A1288	A1289	C1290	G1291	C1292	C1293	G1294	C1295	C1296	G1297	G1298	A1299	G1300	G1301	C1302	C1303	C1304	G1305	A1306	G1307	G1308	G1309	G1310	A1311	G1312	G1313	C1314	G1315	G1316	G1317	A1318	C1319	C1320	G1321	A1322																			
G1142	G1143	A1144	A1145	G1146	C1147	G1148	C1149	G1150	A1151	A1152	G1153	G1154	A1155	G1156	C1157	G1158	A1159	G1160	C1161	C1162	A1163	G1164	A1165	G1166	A1167	G1168	A1169	G1170	A1171	C1172	C1173	G1174	G1175	A1176	G1177	G1178	A1179	A1180	G1181	G1182	G1183	G1184	G1185	G1186	G1187	A1188	G1189	G1190	A1191	C1192	G1193	A1194	C1195	G1196	A1197	G1198	G1199	A1200	A1201																				
U1002	U1003	G1004	U1005	G1006	C1007	G1008	G1009	G1010	U1011	A1012	G1013	G1014	U1015	G1016	G1017	A1018	G1019	A1020	G1021	C1022	C1023	G1024	A1025	G1026	C1027	G1028	U1029	U1030	C1031	G1032	G1033	G1034	A1035	A1036	C1037	G1038	C1039	U1040	G1041	G1042	A1043	A1044	C1045	C1046	G1047	G1048	U1049	U1050	C1051	U1052	G1053	A1054	C1055	G1056	G1057	G1058	C1059	U1060	G1061	U1062	G1063	G1064	G1065	G1066	A1067	G1068	C1069	U1070	C1071	G1072	U1073	G1074	C1075	G1076	U1077	G1078	G1079	A1080	G1081
C962	G963	U964	U965	G966	C967	A968	A969	A970	C971	G972	C973	G974	A975	A976	G977	A978	C979	C980	U981	G982	A983	G984	C985	C986	U987	U988	G989	C990	C991	U992	G993	C994	U995	A996	C997	U998	C999	A1000	C1001	G1002	G1003	A1004	G1005	A1006	C1007	G1008	U1009	C1010	C1011	A1012	G1013	U1014	G1015	A1016	U1017	G1018	A1019	G1020	A1021																				
U842	U843	A844	U845	G846	C847	C848	A849	U850	G851	A852	C853	U854	U855	C856	C857	U858	G859	A860	C861	G862	U863	A864	A865	G866	C867	C868	G869	U870	U871	C872	G873	U874	A875	A876	C877	U878	A879	C880	U881	A882	C883	U884	A885	G886	C887	U888	G889	A890	C891	U892	A893	G894	A895	C896	U897	A898	C899	A900																					
G802	G803	U804	U805	A806	A807	U808	U809	C910	G911	A912	A913	U854	U855	C856	C857	U858	G859	A860	C861	G862	U863	A864	A865	G866	C867	C868	G869	U870	U871	C872	G873	U874	A875	A876	C877	U878	A879	C880	U881	A882	C883	U884	A885	G886	C887	U888	G889	A890	C891	U892	A893	G894	A895	C896	U897	A898	C899	A900																					
A782	C783	A784	G785	G786	A787	U788	U789	A790	G791	A792	U793	A794	C795	C796	C797	U798	U799	G800	U801	A802	G803	U804	C805	C806	A807	C808	G809	C810	C811	G812	U813	A814	U815	C816	U817	A818	U819	U820	G821	C822	G823	U824	A825	C826	U827	U828	U829	G830	A831	G832	U833	U834	U835	G836	U837	C838	U839	A840	C841																				
G722	U723	A724	G725	G726	A727	U728	A729	G730	G731	C732	G733	A734	C735	C736	C737	U738	U739	U740	G741	A742	A743	C744	C745	A746	A747	U748	A749	C750	U751	G752	U753	A754	C755	U756	A757	C758	A759	G760	G761	U762	G763	U764	A765	A766	U767	A768	G769	C770	G771	U772	G773	U774	U775	G776	U777	G778	C779	A780	A781																				

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	32152	Depositor
Resolution determination method	FSC 0.5 CUT-OFF	Depositor
CTF correction method	Weiner filter	Depositor
Microscope	FEI TECNAI F20	Depositor
Voltage (kV)	200	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	20	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	80000	Depositor
Image detector	GATAN ULTRASCAN 4000 (4k x 4k)	Depositor
Maximum map value	4.191	Depositor
Minimum map value	-6.676	Depositor
Average map value	-4.024	Depositor
Map value standard deviation	0.567	Depositor
Recommended contour level	-2.8	Depositor
Map size ( $\text{\AA}$ )	345.0, 345.0, 345.0	wwPDB
Map dimensions	125, 125, 125	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	2.76, 2.76, 2.76	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	N	3.47	5260/36831 (14.3%)	3.94	9443/57458 (16.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	N	0	948

The worst 5 of 5260 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	N	16	A	N7-C5	-19.48	1.27	1.39
1	N	563	A	N7-C5	-18.95	1.27	1.39
1	N	1396	A	N3-C4	-18.85	1.23	1.34
1	N	28	A	N7-C5	-18.07	1.28	1.39
1	N	1243	C	N1-C6	17.88	1.47	1.37

The worst 5 of 9443 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	1362	A	P-O3'-C3'	29.77	155.43	119.70
1	N	1004	A	N1-C6-N6	26.64	134.59	118.60
1	N	766	A	N1-C6-N6	26.51	134.50	118.60
1	N	191	G	C5-C6-O6	-25.76	113.14	128.60
1	N	94	G	P-O3'-C3'	24.94	149.63	119.70

There are no chirality outliers.

5 of 948 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	N	10	A	Sidechain
1	N	2	A	Sidechain
1	N	4	U	Sidechain
1	N	5	U	Sidechain
1	N	6	G	Sidechain

## 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	N	32892	16554	16511	547	0
All	All	32892	16554	16511	547	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 11.

The worst 5 of 547 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:N:664:G:H22	1:N:741:G:H1	1.31	0.76
1:N:596:A:H61	1:N:644:U:H3	1.37	0.73
1:N:116:A:H61	1:N:313:A:H1'	1.56	0.70
1:N:67:C:H2'	1:N:68:G:C8	2.26	0.70
1:N:381:C:C5	1:N:382:A:C5	2.81	0.69

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

There are no protein molecules in this entry.

### 5.3.2 Protein sidechains [i](#)

There are no protein molecules in this entry.



### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	N	1532/1533 (99%)	451 (29%)	150 (9%)

5 of 451 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	N	3	A
1	N	4	U
1	N	5	U
1	N	6	G
1	N	8	A

5 of 150 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	N	1190	G
1	N	1440	U
1	N	1201	A
1	N	1319	A
1	N	428	G

## 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

There are no chain breaks in this entry.

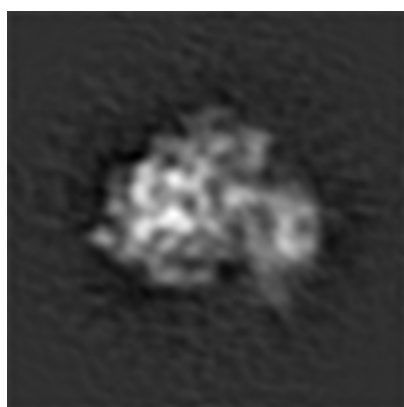
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-5500. These allow visual inspection of the internal detail of the map and identification of artifacts.

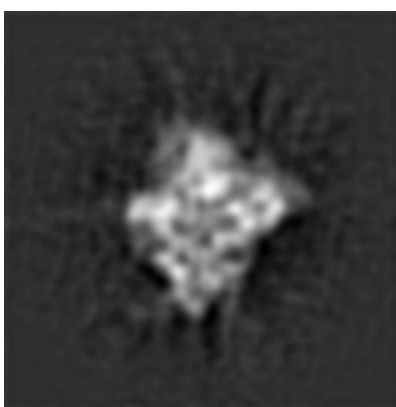
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

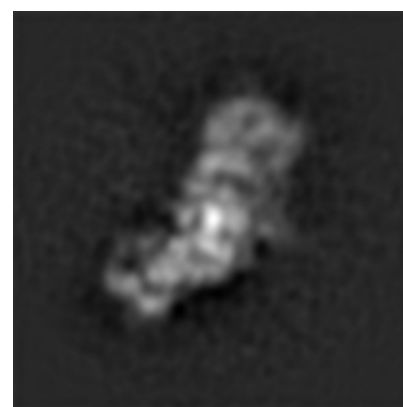
#### 6.1.1 Primary map



X



Y

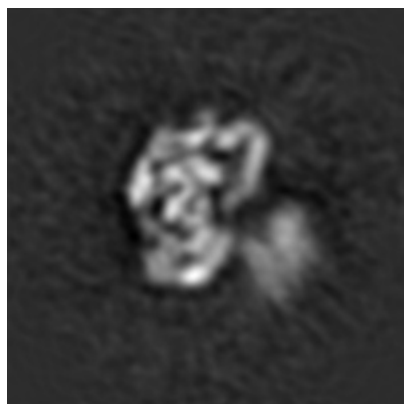


Z

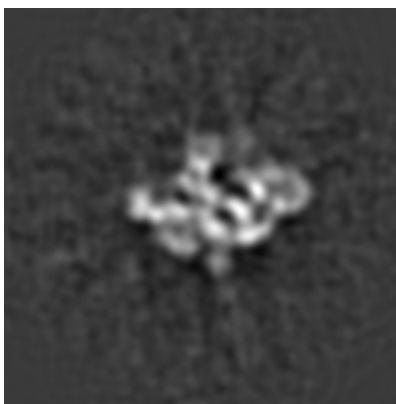
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

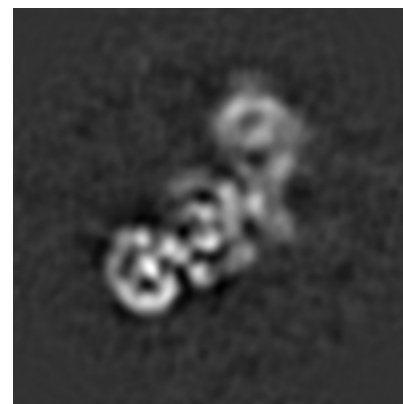
#### 6.2.1 Primary map



X Index: 62



Y Index: 62

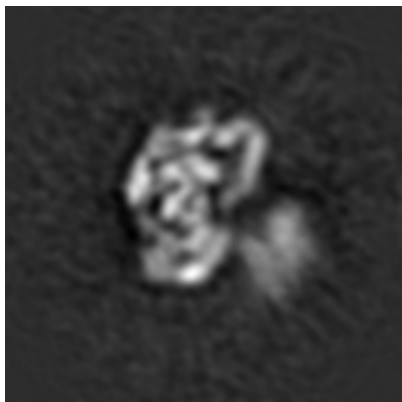


Z Index: 62

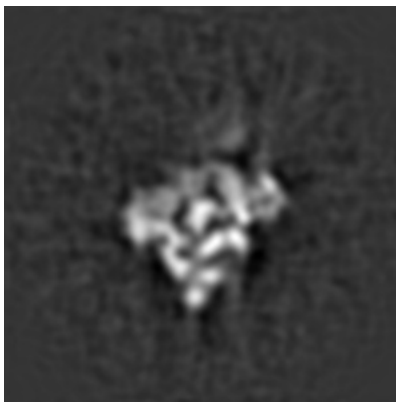
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [\(i\)](#)

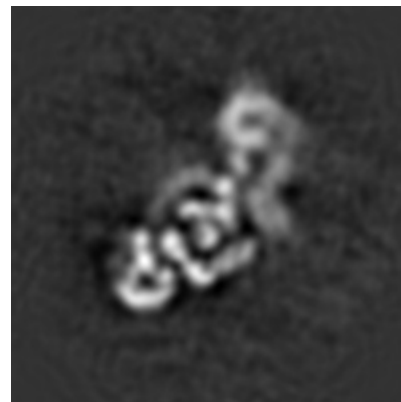
### 6.3.1 Primary map



X Index: 62



Y Index: 51

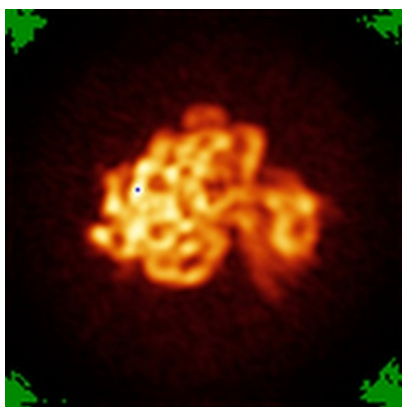


Z Index: 64

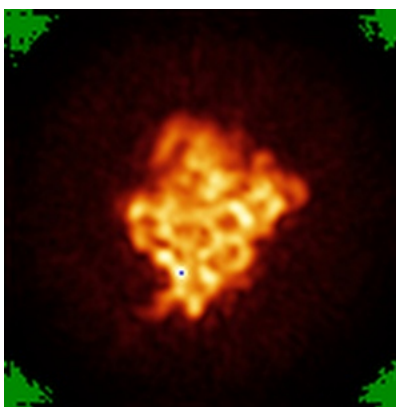
The images above show the largest variance slices of the map in three orthogonal directions.

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

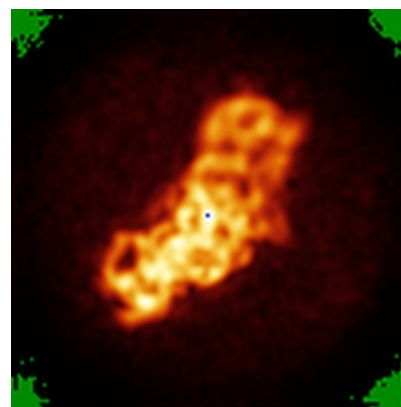
### 6.4.1 Primary map



X



Y

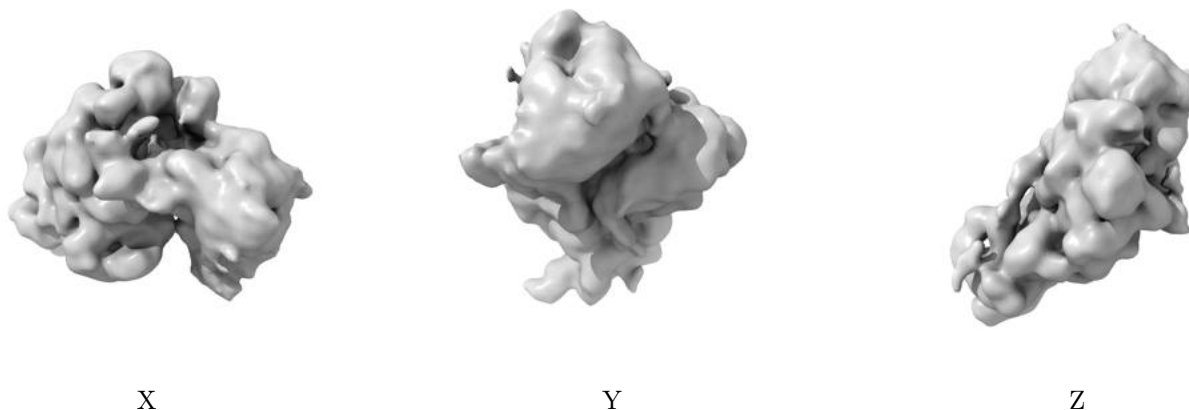


Z

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 - 2.8. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

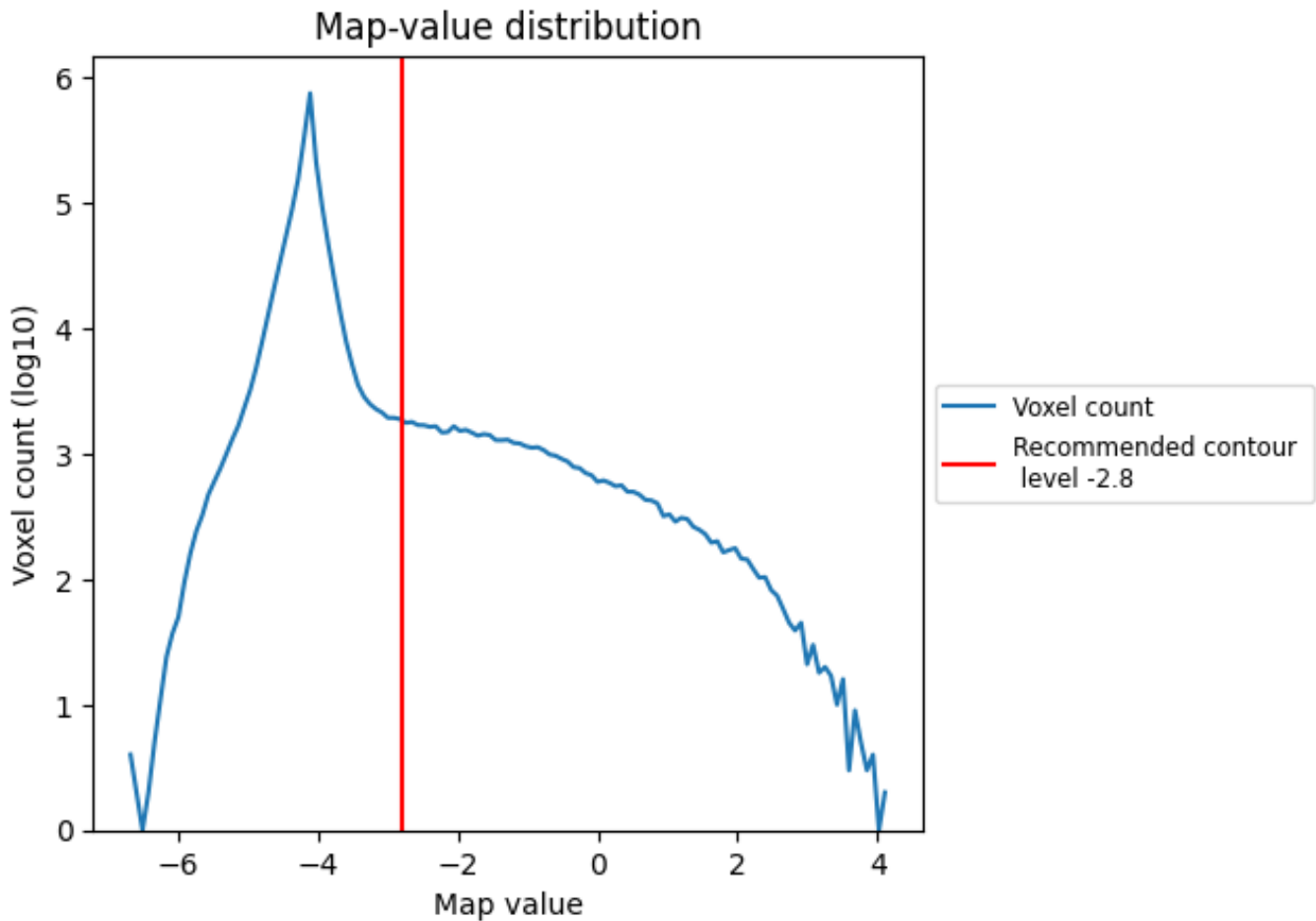
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

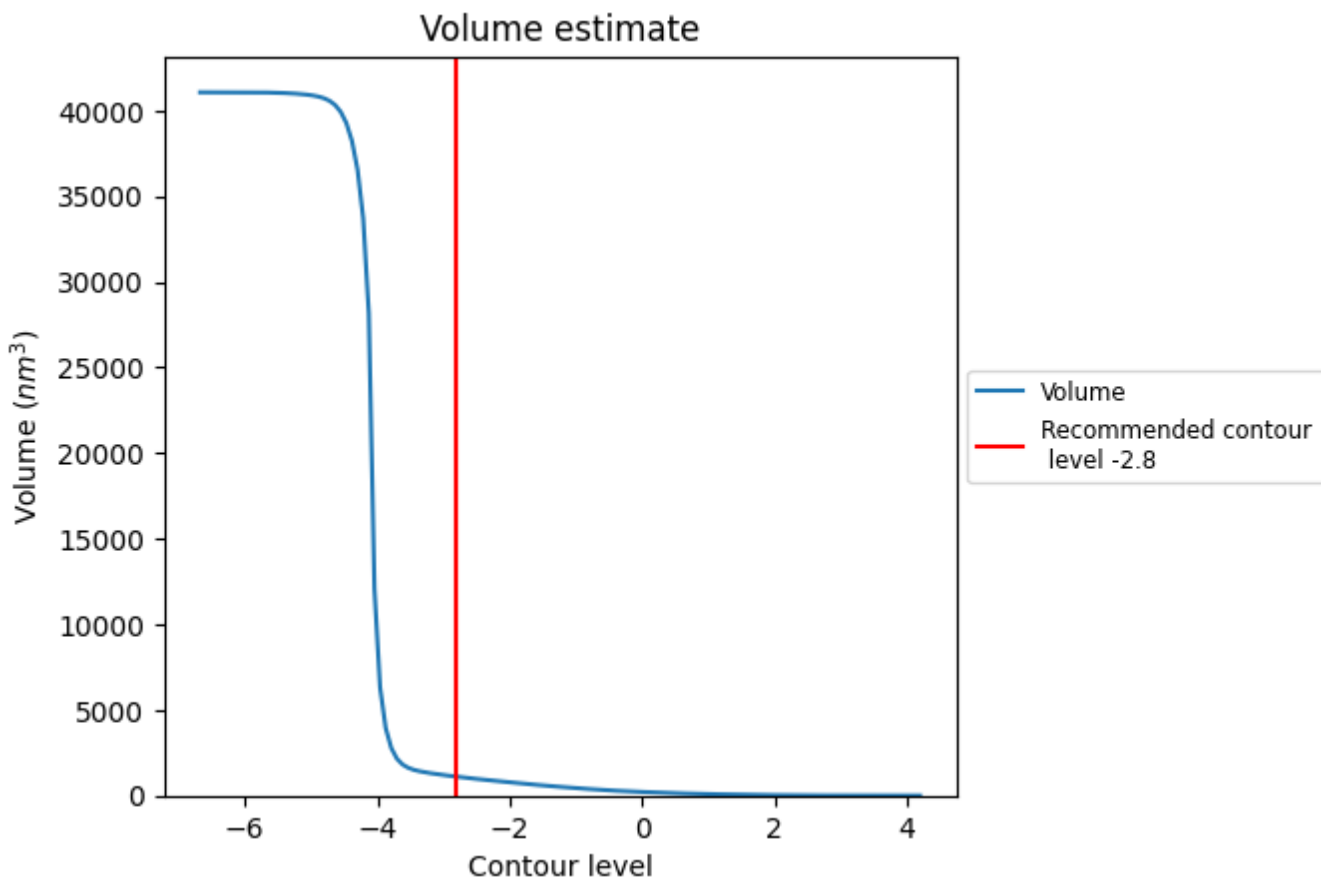
This section contains the results of statistical analysis of the map.

### 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.

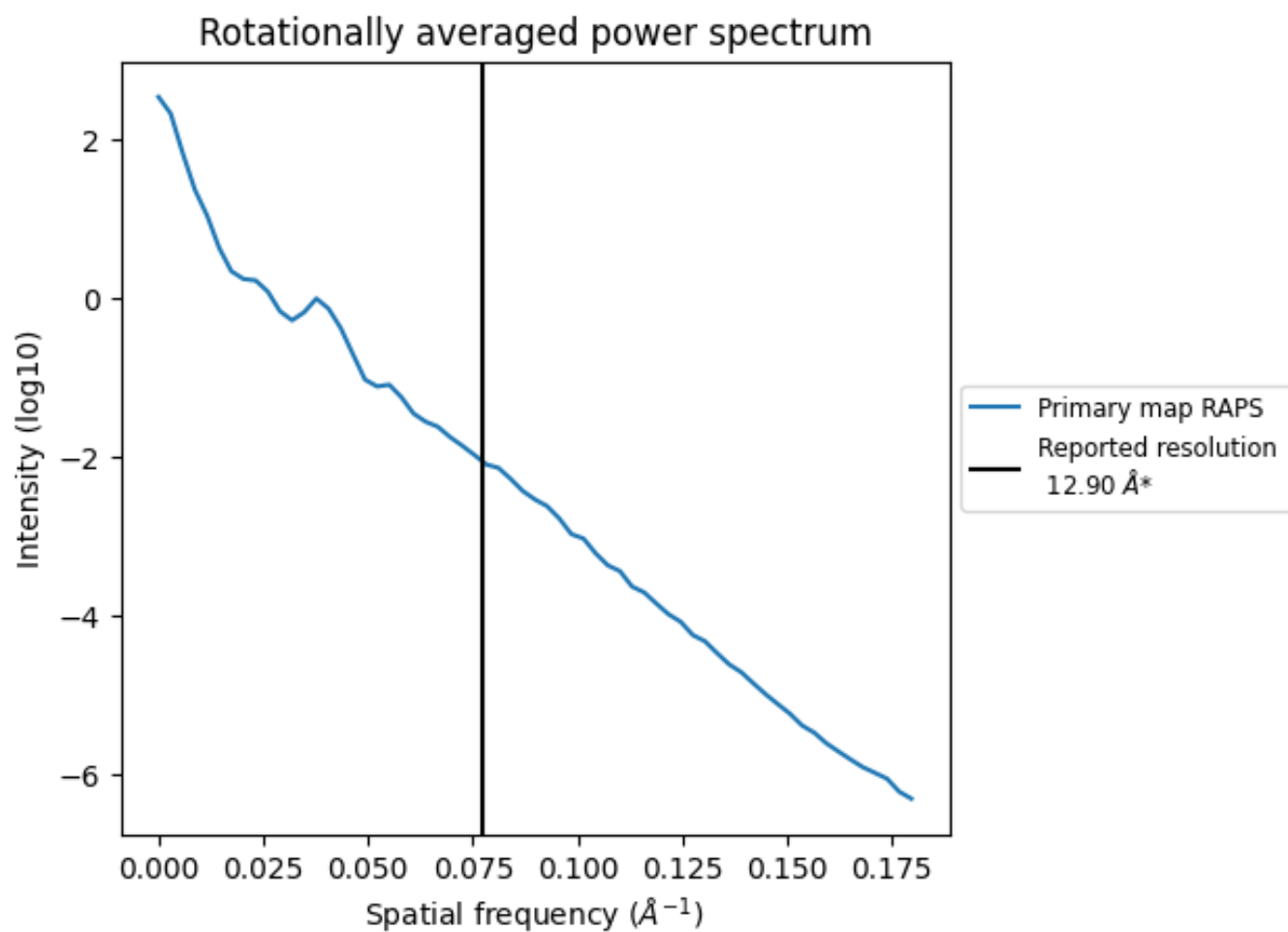
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is  $1102 \text{ nm}^3$ ; this corresponds to an approximate mass of 995 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 0.078 Å<sup>-1</sup>



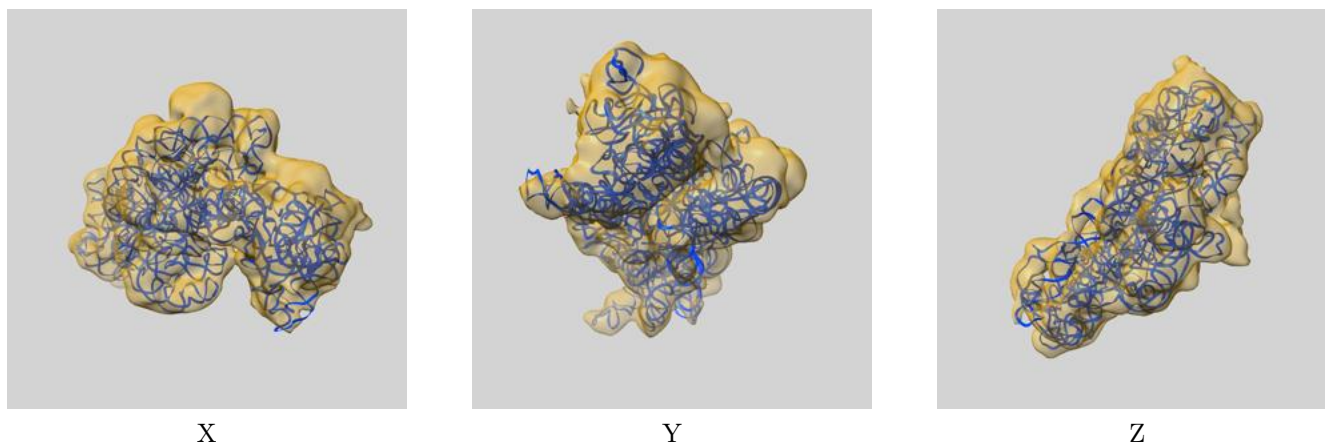
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

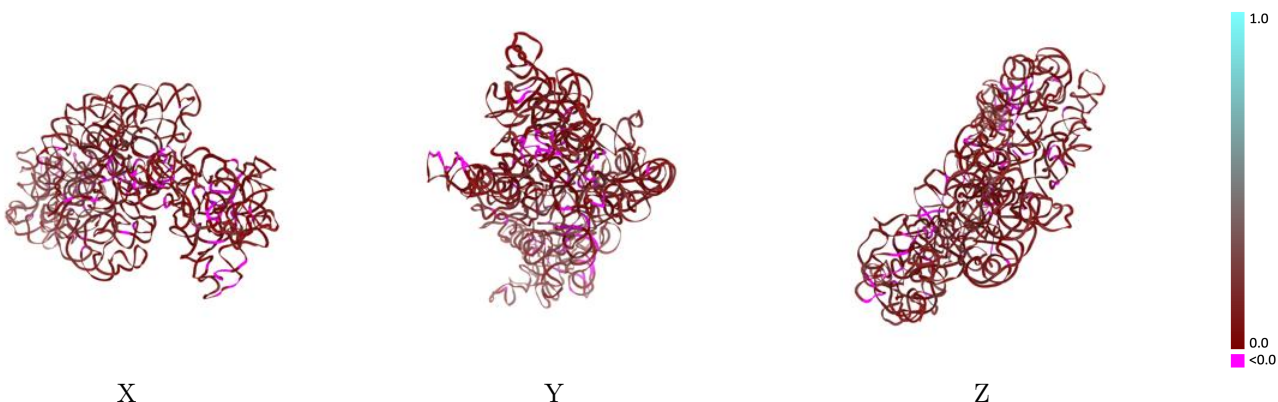
This section contains information regarding the fit between EMDB map EMD-5500 and PDB model 3J28. Per-residue inclusion information can be found in section 3 on page 4.

### 9.1 Map-model overlay [i](#)



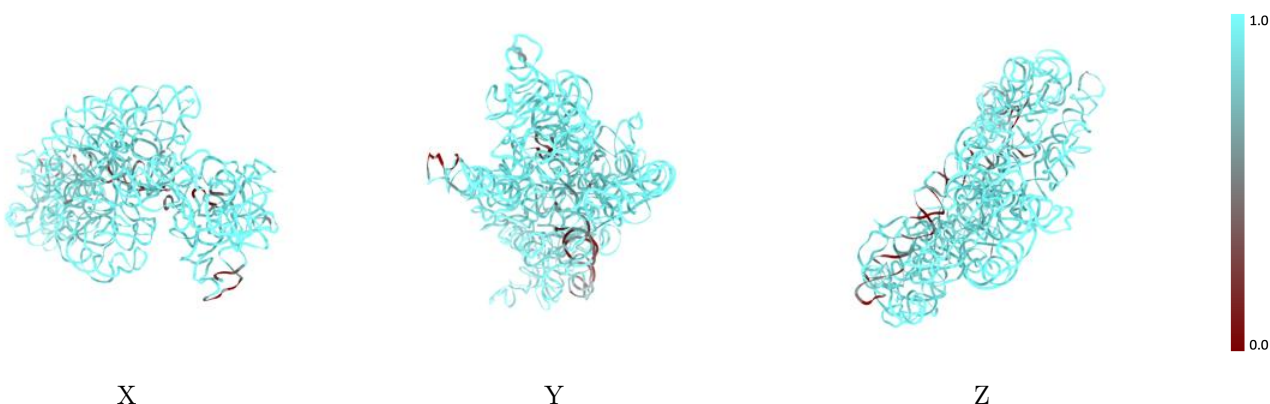
The images above show the 3D surface view of the map at the recommended contour level -2.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



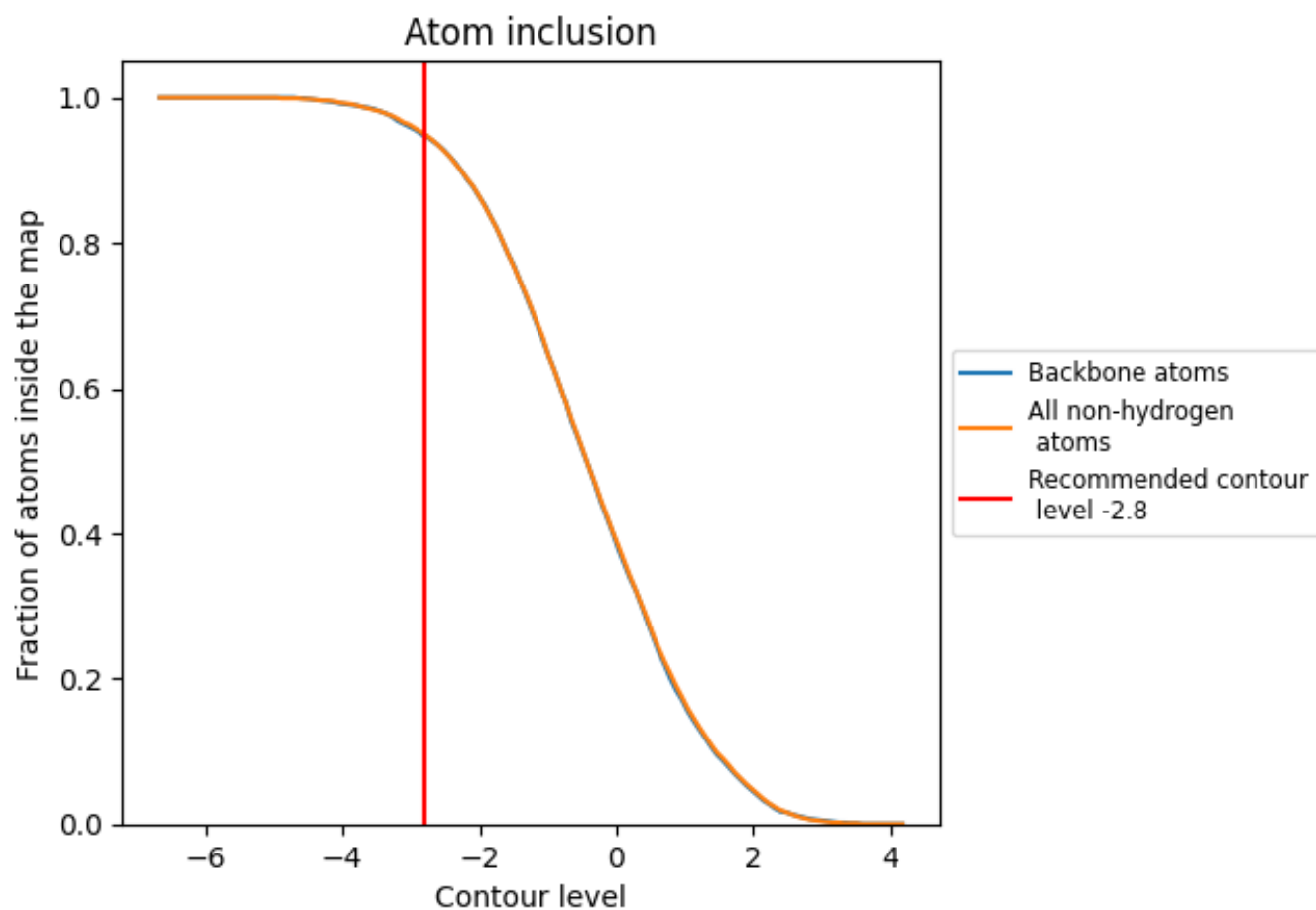
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (-2.8).





## 9.4 Atom inclusion [i](#)



At the recommended contour level, 95% of all backbone atoms, 95% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (-2.8) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9500	 0.1010
N	 0.9500	 0.1010

