



# wwPDB EM Validation Summary Report ⓘ

Mar 13, 2024 – 12:40 PM JST

PDB ID : 3J2H  
EMDB ID : EMD-5510  
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 : 18.80 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

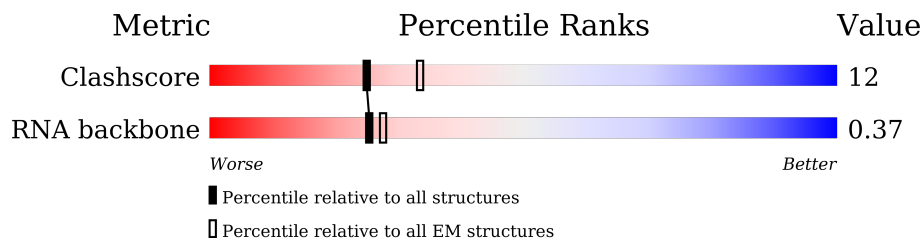
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*


The reported resolution of this entry is 18.80 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.

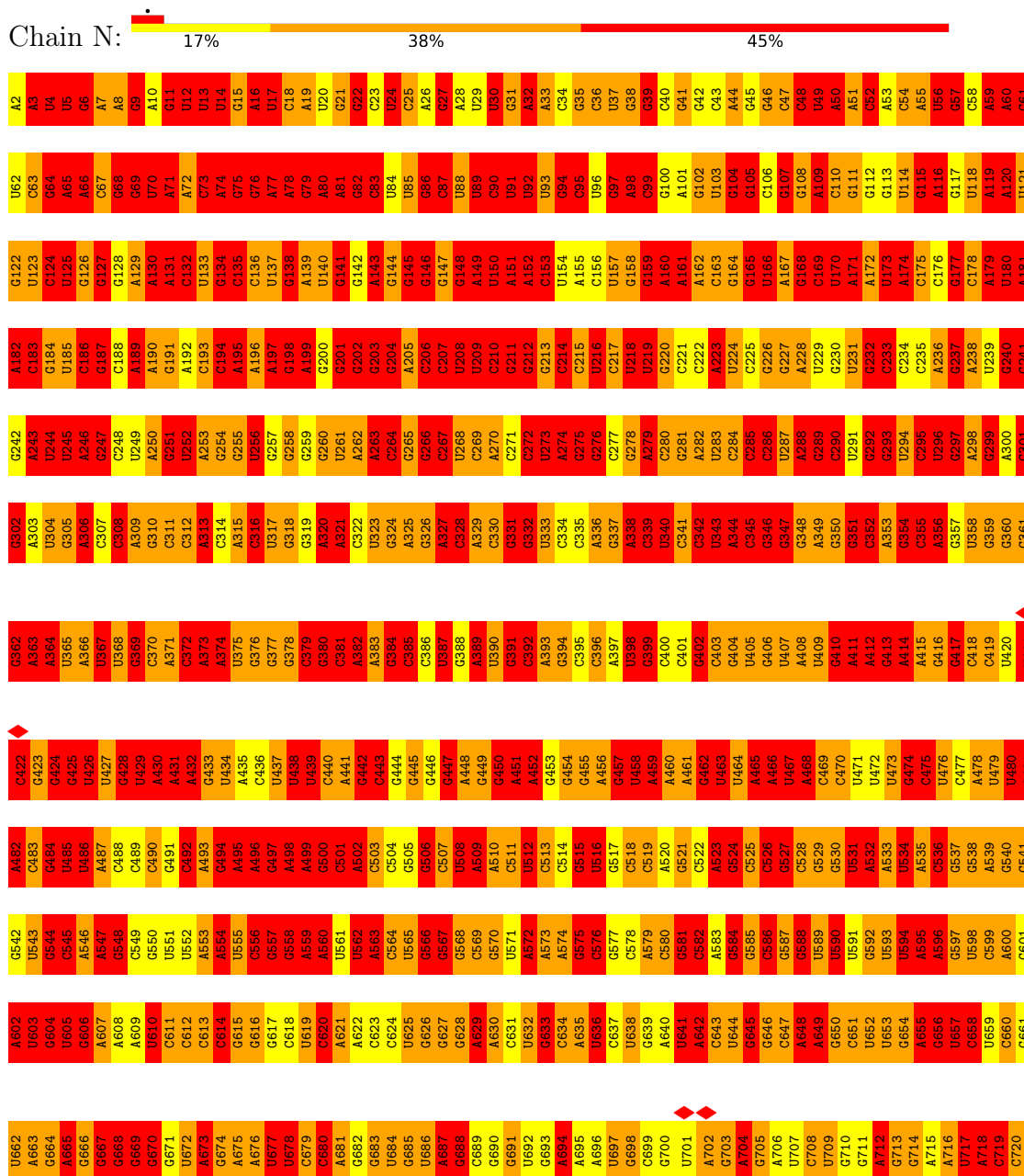
- Molecule 1 is a RNA chain called 16S rRNA.

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



G1502	G1503	G1504	G1505	G1506	G1507	G1508	G1509	C1510	G1511	G1512	G1513	G1514	G1515	G1516	G1517	G1518	G1519	C1520	C1521	G1522	G1523	G1524	G1525	G1526	G1527	G1528	G1529	G1530	A1531	G1532	G1533	A1534																													
G1442	G1443	G1444	G1445	G1446	G1447	G1448	G1449	G1450	G1451	G1452	G1453	G1454	G1455	G1456	G1457	G1458	G1459	G1460	G1461	G1462	G1463	G1464	G1465	G1466	G1467	G1468	G1469	G1470	G1471	G1472	G1473	G1474	G1475	G1476	G1477	G1478	G1479	G1480	G1481	G1482	G1483	G1484	G1485	G1486	G1487	G1488	G1489	G1490	G1491	G1492	G1493	G1494	G1495	G1496	G1497	G1498	G1499	A1500	C1501		
C1382	C1383	C1384	C1385	G1386	G1387	C1388	C1389	C1390	G1391	G1392	G1393	G1394	C1395	C1396	C1397	G1398	C1399	C1400	G1401	C1402	C1403	G1404	G1405	G1406	C1407	A1408	C1409	C1410	C1411	C1412	A1413	G1414	G1415	G1416	G1417	A1418	G1419	G1420	G1421	G1422	G1423	G1424	G1425	G1426	G1427	G1428	A1429	A1430	A1431	G1432	G1433	G1434	G1435	G1436	G1437	G1438	G1439	G1440	A1441		
C1322	G1323	A1324	C1325	G1326	C1327	C1328	A1329	C1330	G1331	A1332	G1333	G1334	C1335	C1336	G1337	G1338	A1339	C1340	G1341	C1342	G1343	C1344	G1345	G1346	G1347	G1348	A1349	C1350	G1351	C1352	G1353	G1354	G1355	G1356	A1357	G1358	C1359	A1360	G1361	A1362	G1363	G1364	G1365	C1366	C1367	A1368	C1369	G1370	G1371	A1372	G1373	A1374	A1375	G1376	G1377	C1378	G1379	G1380	G1381		
C1262	C1263	G1264	C1265	G1266	C1267	G1268	A1269	C1270	G1271	A1272	G1273	C1274	G1275	A1276	G1277	G1278	G1279	A1280	C1281	C1282	G1283	C1284	A1285	G1286	A1287	A1288	A1289	G1290	G1291	G1292	G1293	G1294	G1295	G1296	G1297	G1298	G1299	G1300	G1301	C1302	G1303	G1304	G1305	A1306	G1307	G1308	G1309	A1310	A1311	G1312	G1313	G1314	G1315	A1256	G1257	G1258	G1259	A1318	A1319	C1320	G1321
G1142	G1143	G1144	G1145	G1146	G1147	G1148	G1149	A1150	A1151	A1152	G1153	G1154	A1155	G1156	G1157	G1158	G1159	G1160	A1101	C1102	C1103	G1104	G1105	G1106	A1107	G1108	G1109	G1110	A1111	C1112	C1113	G1114	G1115	G1116	A1117	G1118	A1119	A1180	G1181	G1182	G1183	G1184	G1185	G1186	G1187	A1188	G1189	G1190	A1191	C1192	G1193	G1194	C1195	A1196	A1197	G1198	G1199	G1200	C1140	A1201	A1081
G1082	G1083	G1084	G1085	G1086	G1087	G1088	G1089	G1090	G1091	A1092	A1093	G1094	G1095	C1096	C1097	G1098	C1099	C1100	A1101	A1102	C1103	G1104	A1105	G1106	C1107	G1108	G1109	G1110	A1111	C1112	C1113	G1114	G1115	G1116	A1117	G1118	C1119	G1120	G1121	G1122	G1123	G1124	G1125	G1126	G1127	C1128	C1129	A1130	G1131	G1132	G1133	G1134	G1135	C1136	C1137	G1138	G1139	C1140	C1141		
A1022	U1023	G1024	U1025	G1026	C1027	C1028	U1029	U1030	C972	G973	A974	G1032	G1033	G1034	A1035	A1036	C1037	C1038	G1039	U1040	G1041	A1042	G1043	A1044	C1045	A1046	G1047	C930	G991	U992	G993	A994	C995	A996	U997	C998	C999	A1000	C1001	U1002	U1003	U1004	U1005	G1006	G1007	U1008	U1009	U1010	C1011	A1012	G1013	A1014	G1015	A1016	U1017	G1018	A1019	G1020	A1021		
G962	G963	U964	U965	G966	G967	A968	A969	C970	G971	C972	G973	A974	A975	G976	A977	A978	C979	C980	U981	U982	A983	C984	C985	U986	C987	C988	U989	G990	U991	U992	G993	A994	C995	A996	U997	C998	C999	A1000	C1001	U1002	U1003	U1004	U1005	G1006	G1007	U1008	U1009	U1010	C1011	A1012	G1013	A1014	G1015	A1016	U1017	G1018	A1019	G1020	A1021		
G902	G903	U904	U905	G906	A907	A908	A909	C910	G911	C912	G913	A914	A915	U916	C917	G918	A919	U920	U921	U922	A923	C924	G925	U926	C927	G928	U929	C930	C931	U932	G933	C934	A935	U936	A937	U938	C939	G940	G941	U942	G943	G944	G945	A946	G947	U948	A949	U950	G951	U952	C953	G954	U955	G956	U957	A958	U959	A960	U961		
U842	U843	G844	A845	G846	G847	G848	A849	U850	G851	G852	G853	U854	U855	C856	C857	G858	G859	U860	C861	U862	U863	A864	C865	C866	C867	C868	U869	U870	U871	U872	U873	U874	A875	U876	U877	U878	U879	C880	G881	C882	C883	U884	U885	G886	G887	U888	U889	U890	U891	U892	C893	C894	U895	U896	U897	C898	U899	A900	A901		
U722	U723	G724	G725	G726	G727	A728	A729	G730	G731	C732	G733	G734	C735	C736	C737	G738	G739	U740	G741	G742	A743	C744	G745	G746	A747	G748	A749	U750	U751	G752	A753	C754	G755	U756	C757	A758	A759	G760	G761	U762	C763	C764	G765	A766	A767	U768	U769	G770	G771	U772	G773	G774	G775	G776	A777	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	11474	Depositor
Resolution determination method	FSC 0.5 CUT-OFF	Depositor
CTF correction method	Weiner filter	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	20	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	3800	Depositor
Magnification	59000	Depositor
Image detector	FEI EAGLE (4k x 4k)	Depositor
Maximum map value	4.629	Depositor
Minimum map value	-7.414	Depositor
Average map value	-4.262	Depositor
Map value standard deviation	0.653	Depositor
Recommended contour level	-2.3	Depositor
Map size ( $\text{\AA}$ )	375.0, 375.0, 375.0	wwPDB
Map dimensions	125, 125, 125	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	3.0, 3.0, 3.0	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	5192/36831 (14.1%)	3.99	9508/57458 (16.5%)

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	978

The worst 5 of 5192 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	N	815	A	N7-C5	-18.92	1.27	1.39
1	N	435	A	N7-C5	-18.59	1.28	1.39
1	N	572	A	N7-C5	-18.24	1.28	1.39
1	N	367	U	C2-N3	17.85	1.50	1.37
1	N	202	G	N7-C5	16.97	1.49	1.39

The worst 5 of 9508 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	567	G	C5-C6-O6	-27.97	111.82	128.60
1	N	184	G	N1-C6-O6	26.91	136.04	119.90
1	N	184	G	C5-C6-O6	-26.87	112.48	128.60
1	N	567	G	N1-C6-O6	25.95	135.47	119.90
1	N	713	G	N1-C6-O6	24.64	134.69	119.90

There are no chirality outliers.

5 of 978 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	N	3	A	Sidechain
1	N	4	U	Sidechain
1	N	5	U	Sidechain
1	N	6	G	Sidechain
1	N	9	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	16521	571	0
All	All	32892	16554	16521	571	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 12.

The worst 5 of 571 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:32:A:H4'	1:N:48:C:H42	1.50	0.75
1:N:594:U:C4	1:N:595:A:C6	2.74	0.75
1:N:338:A:H61	1:N:351:G:H1	1.36	0.73
1:N:116:A:H61	1:N:313:A:H1'	1.53	0.73
1:N:197:A:H2	1:N:198:G:C4	2.08	0.70

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%)	449 (29%)	152 (9%)

5 of 449 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	7	A

5 of 152 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	N	1189	U
1	N	1432	G
1	N	1224	U
1	N	1319	A
1	N	1532	U

## 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.

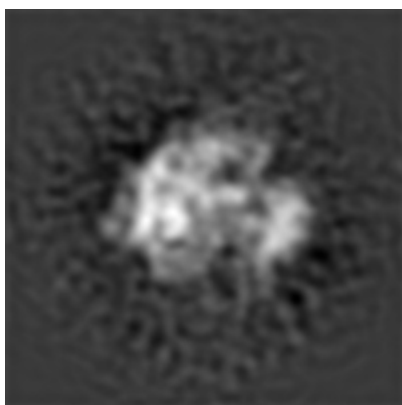
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-5510. These allow visual inspection of the internal detail of the map and identification of artifacts.

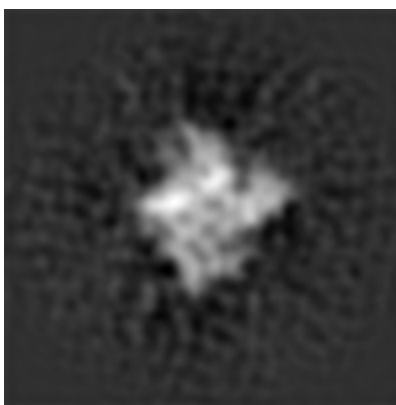
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

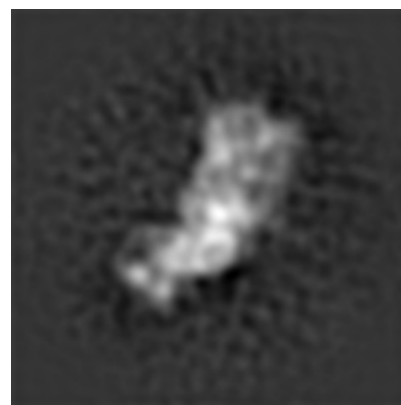
#### 6.1.1 Primary map



X



Y

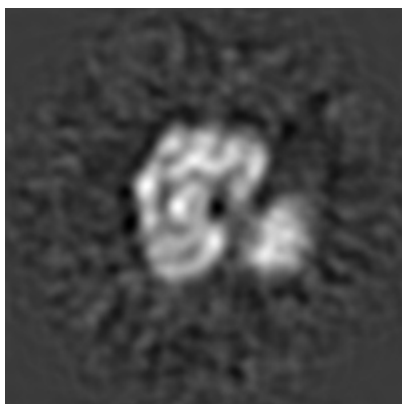


Z

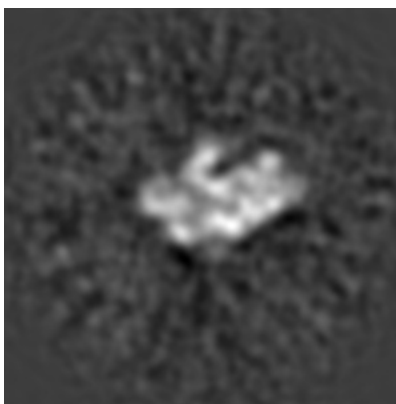
The images above show the map projected in three orthogonal directions.

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

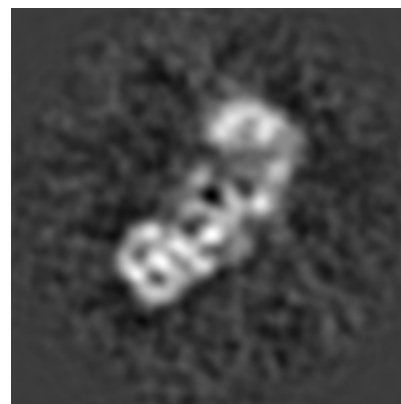
#### 6.2.1 Primary map



X Index: 62



Y Index: 62

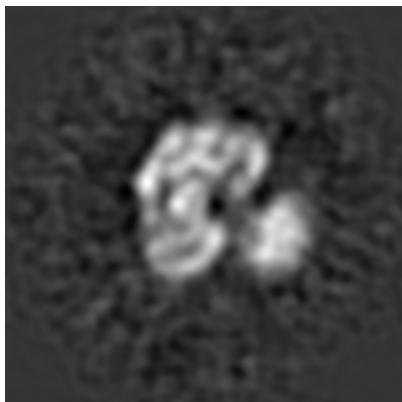


Z Index: 62

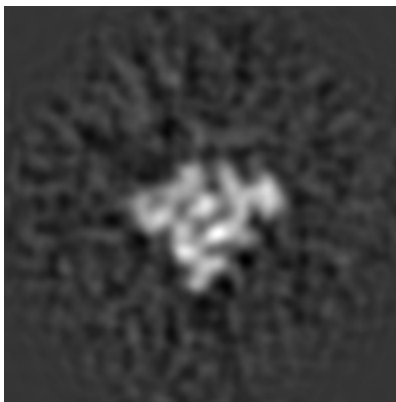
The images above show central slices of the map in three orthogonal directions.

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

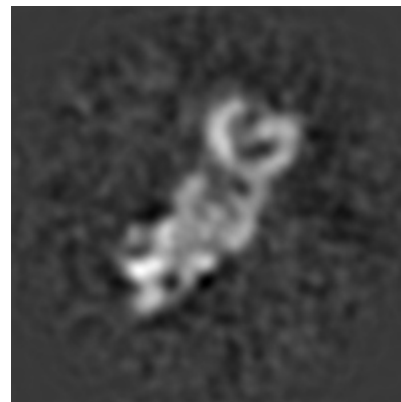
### 6.3.1 Primary map



X Index: 63



Y Index: 53

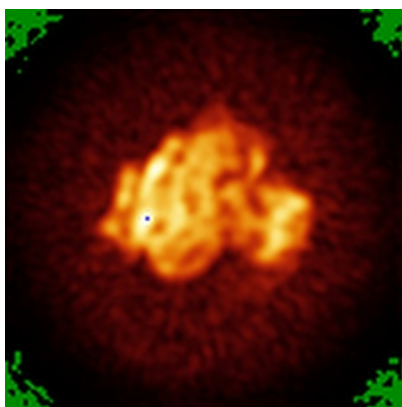


Z Index: 58

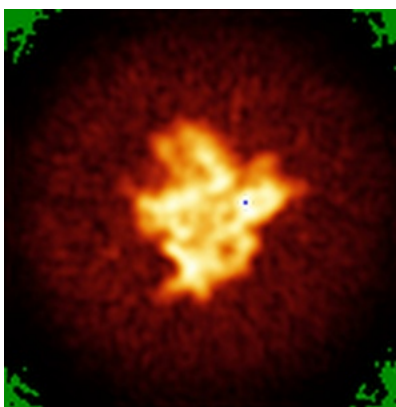
The images above show the largest variance slices of the map in three orthogonal directions.

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

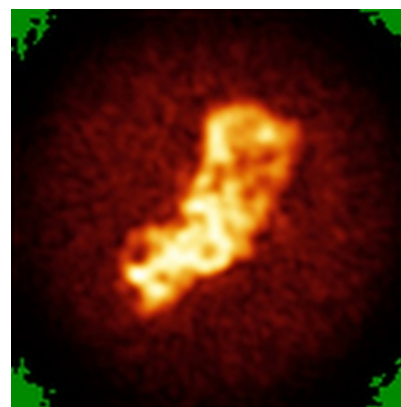
### 6.4.1 Primary map



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

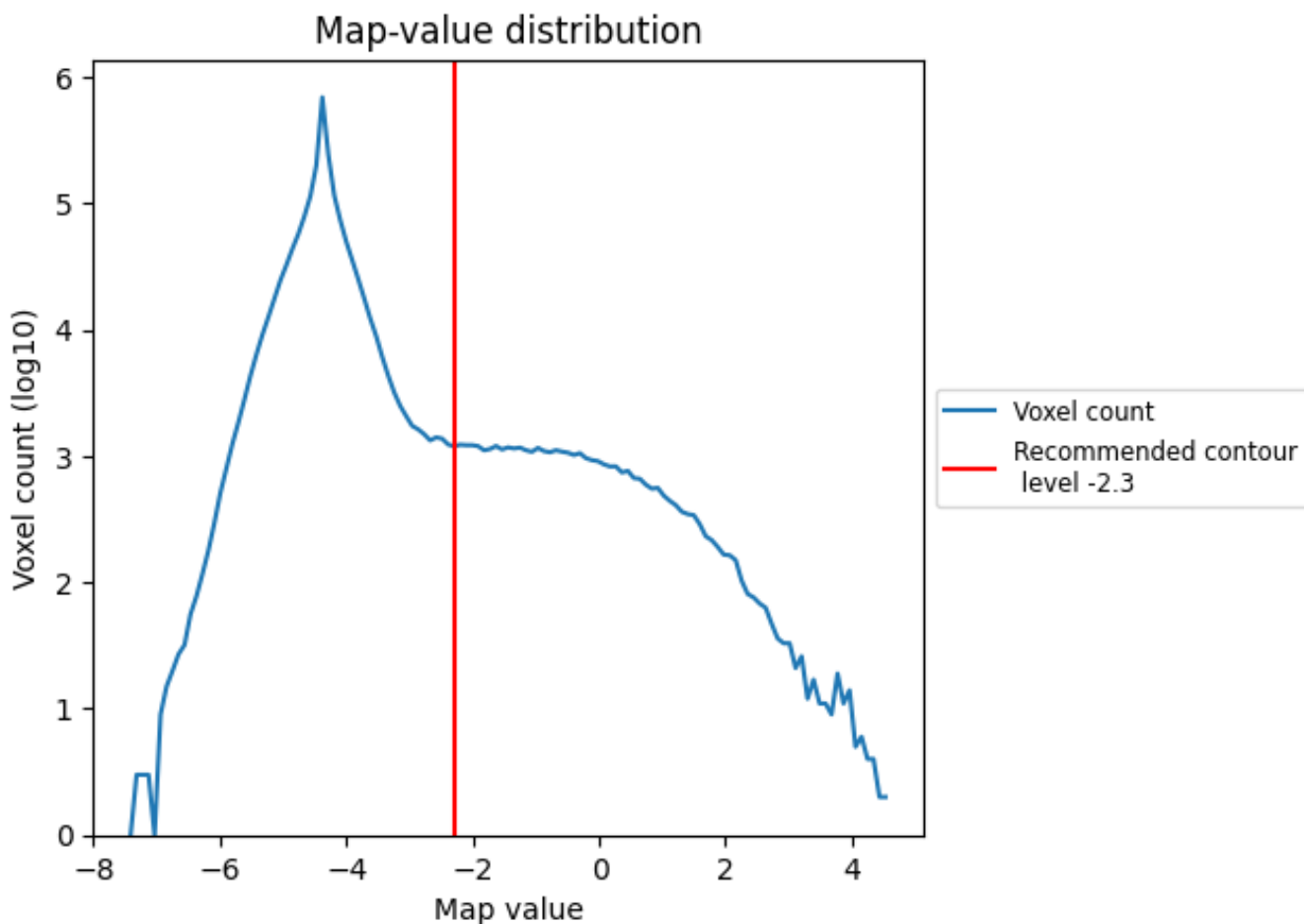
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

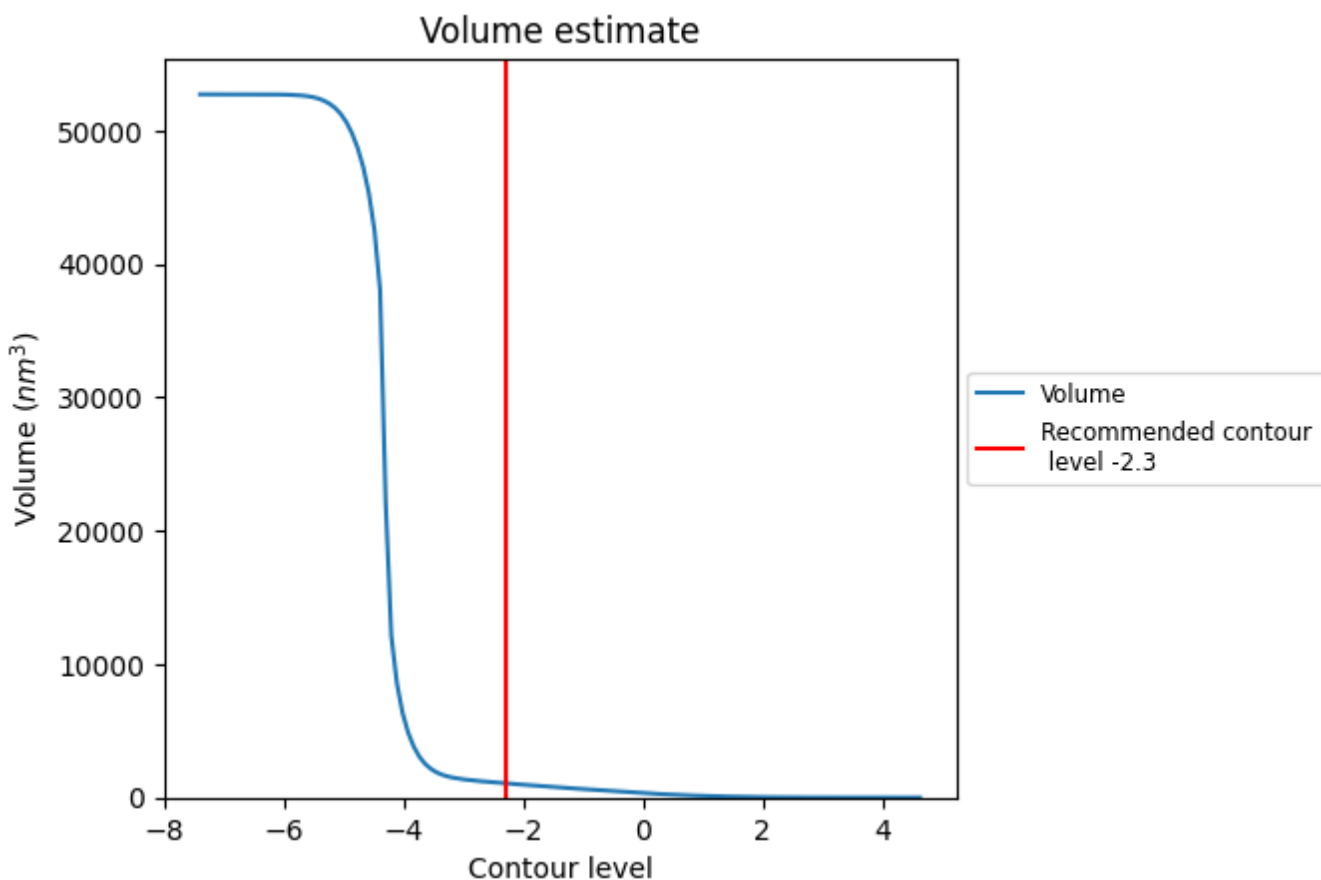
This section contains the results of statistical analysis of the map.

### 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.

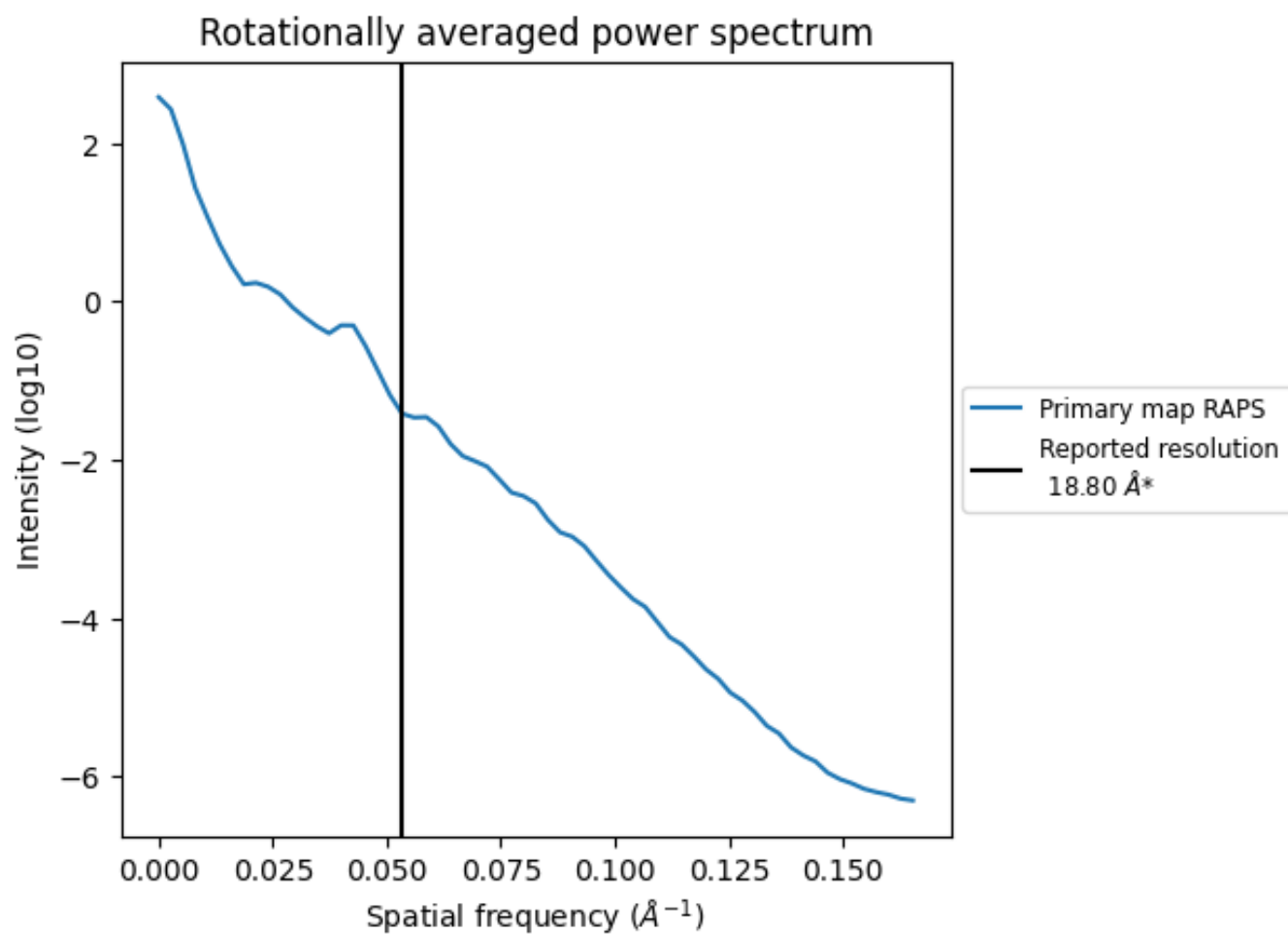
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is  $1065 \text{ nm}^3$ ; this corresponds to an approximate mass of 962 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 0.053 Å<sup>-1</sup>



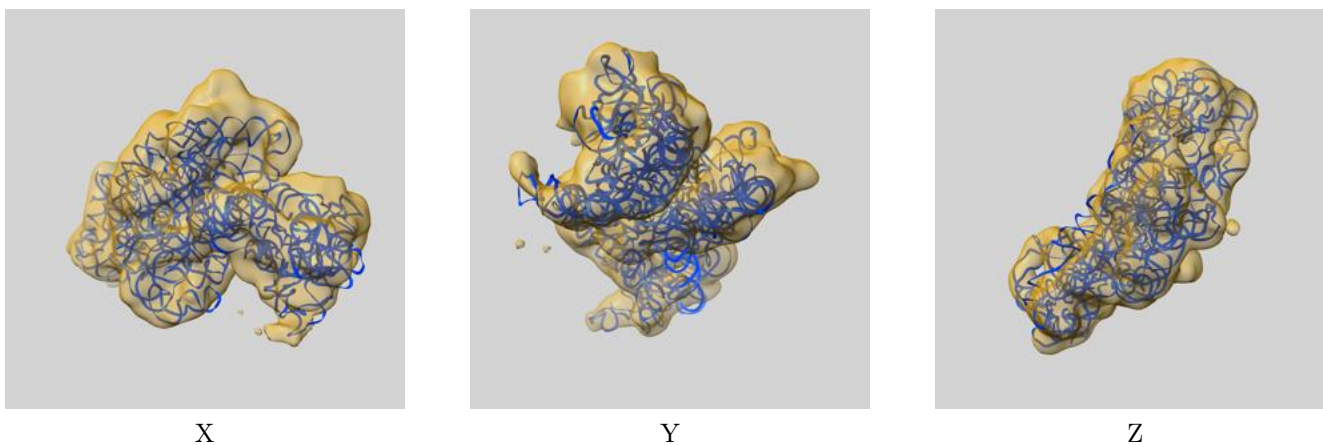
## 8 Fourier-Shell correlation

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

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

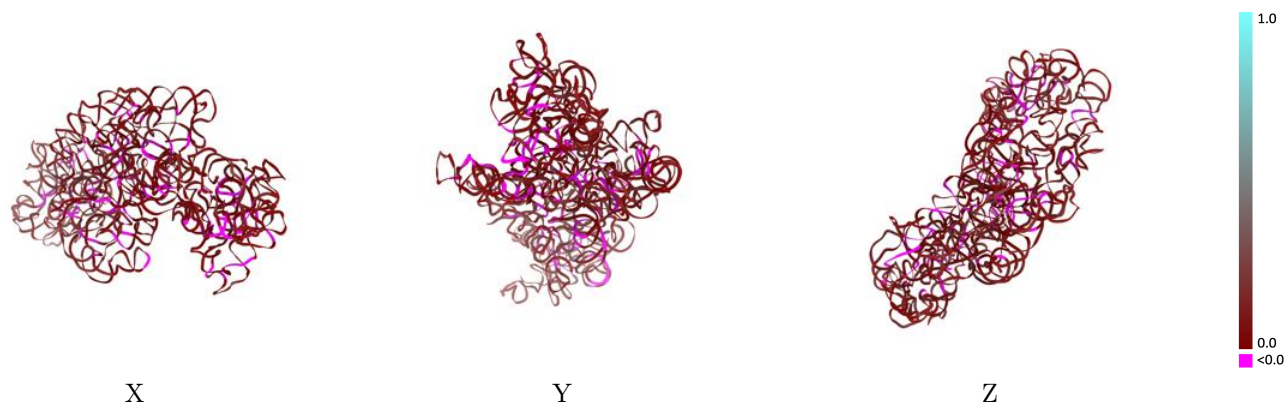
This section contains information regarding the fit between EMDB map EMD-5510 and PDB model 3J2H. Per-residue inclusion information can be found in section 3 on page 4.

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



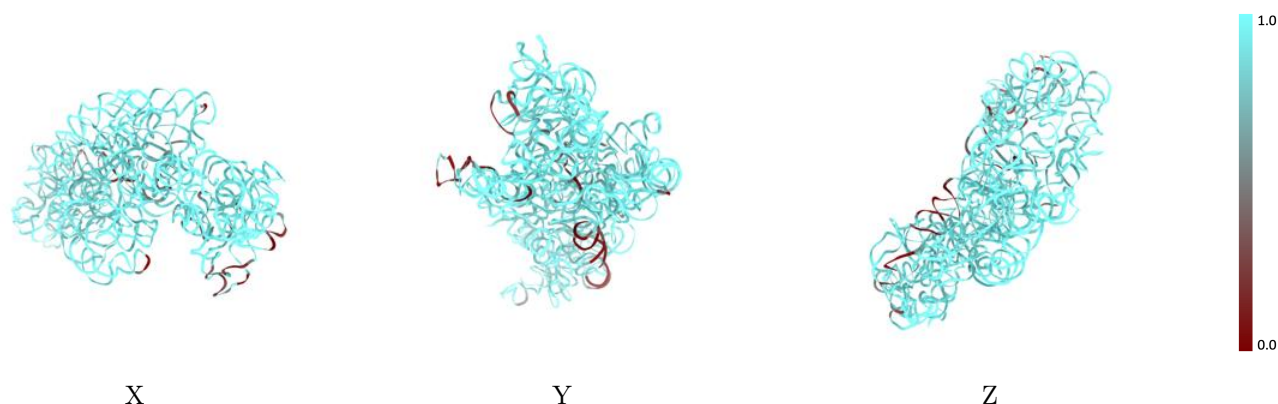
The images above show the 3D surface view of the map at the recommended contour level -2.3 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



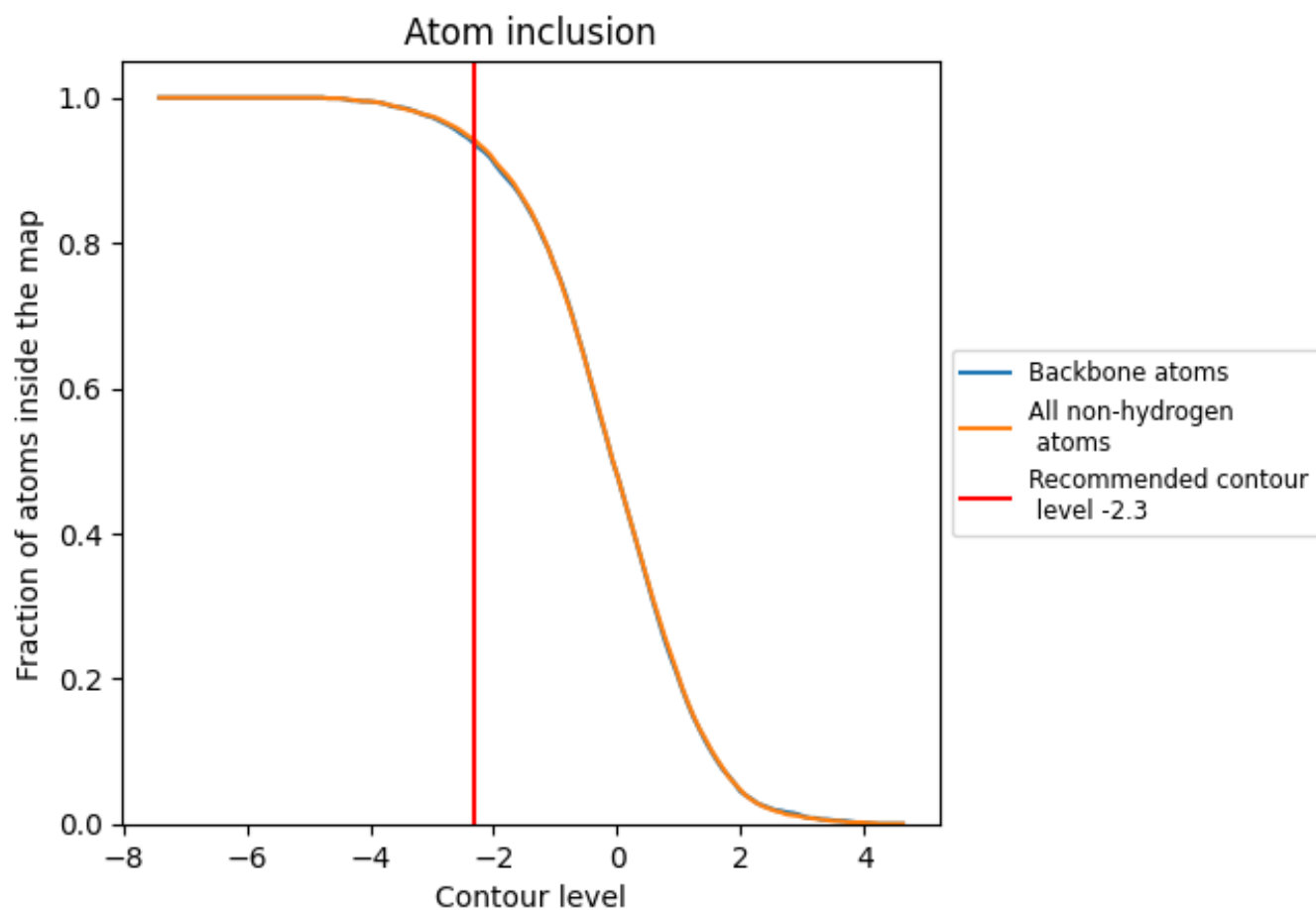
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (-2.3).





## 9.4 Atom inclusion [i](#)



At the recommended contour level, 94% of all backbone atoms, 94% 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 (-2.3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9410	 0.0780
N	 0.9420	 0.0780

