



## Full wwPDB EM Validation Report ⓘ

Nov 14, 2022 – 03:02 PM JST

PDB ID : 6J5U  
EMDB ID : EMD-0681  
Title : Ligand-triggered allosteric ADP release primes a plant NLR complex  
Authors : Wang, J.Z.; Wang, J.; Meijuan, H.; Wang, H.W.; Zhou, J.M.; Chai, J.J.  
Deposited on : 2019-01-12  
Resolution : 3.90 Å(reported)  
Based on initial model : 3TL8

This is a Full wwPDB EM Validation 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.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

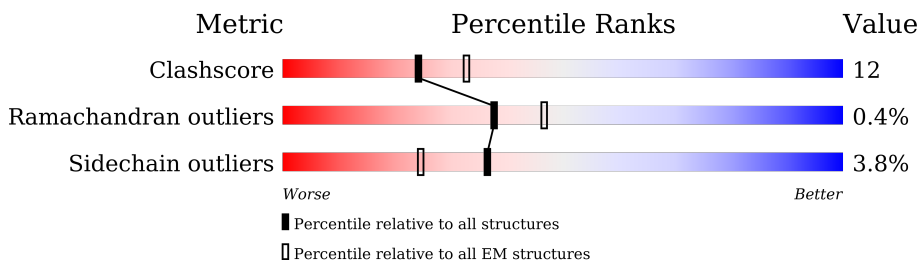
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.90 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
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  $\geq 3$ , 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	A	852	
2	C	426	
3	B	351	

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 9288 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 Disease resistance RPP13-like protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	663	5266	3320	900	1010	36	0	0

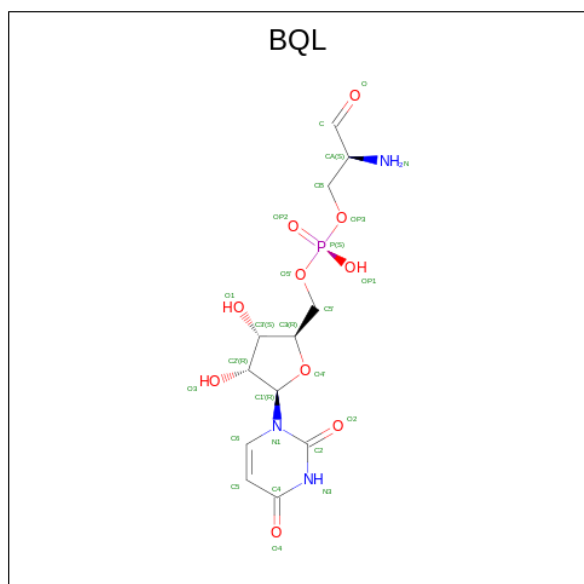
- Molecule 2 is a protein called Probable serine/threonine-protein kinase PBL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	172	1340	864	232	238	6	0	0

- Molecule 3 is a protein called Protein kinase superfamily protein.

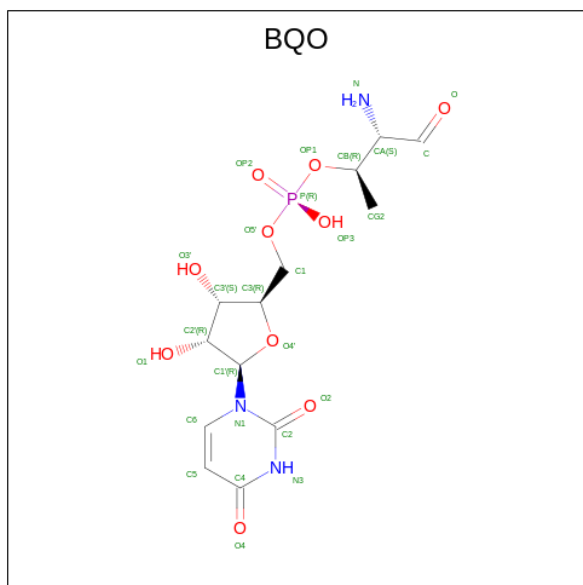
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	B	327	2629	1686	447	479	17	0	0

- Molecule 4 is [(2 {S})-2-azanyl-3-oxidanylidene-propyl] [(2 {R},3 {S},4 {R},5 {R})-5-[2,4-bis(oxidanylidene)pyrimidin-1-yl]-3,4-bis(oxidanyl)oxolan-2-yl]methyl hydrogen phosphate (three-letter code: BQL) (formula: C<sub>12</sub>H<sub>18</sub>N<sub>3</sub>O<sub>10</sub>P).



Mol	Chain	Residues	Atoms					AltConf
4	C	1	Total	C	N	O	P	0
			26	12	3	10	1	

- Molecule 5 is [(2 {R},3 {S})-3-azanyl-4-oxidanylidene-butan-2-yl] [(2 {R},3 {S},4 {R},5 {R})-5-[2,4-bis(oxidanylidene)pyrimidin-1-yl]-3,4-bis(oxidanyl)oxolan-2-yl]methyl hydrogen phosphate (three-letter code: BQO) (formula: C<sub>13</sub>H<sub>20</sub>N<sub>3</sub>O<sub>10</sub>P).



Mol	Chain	Residues	Atoms					AltConf
5	C	1	Total	C	N	O	P	0
			27	13	3	10	1	





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	404311	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	700	Depositor
Maximum defocus (nm)	900	Depositor
Magnification	105000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.191	Depositor
Minimum map value	-0.103	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	174.56, 174.56, 174.56	wwPDB
Map dimensions	160, 160, 160	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.091, 1.091, 1.091	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BQO, BQL

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	A	0.39	0/5365	0.75	7/7256 (0.1%)
2	C	0.33	0/1365	0.62	0/1841
3	B	0.44	0/2683	0.75	3/3621 (0.1%)
All	All	0.40	0/9413	0.73	10/12718 (0.1%)

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	A	0	4
2	C	0	1
3	B	0	1
All	All	0	6

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	663	LEU	CA-CB-CG	6.45	130.13	115.30
1	A	776	LEU	CA-CB-CG	6.03	129.16	115.30
3	B	276	LEU	CA-CB-CG	5.77	128.56	115.30
3	B	318	LEU	CA-CB-CG	5.71	128.44	115.30
1	A	418	CYS	CA-CB-SG	5.58	124.05	114.00
1	A	829	LEU	CA-CB-CG	5.58	128.13	115.30
1	A	801	LEU	CA-CB-CG	5.49	127.92	115.30
3	B	209	ASP	CB-CG-OD1	5.40	123.16	118.30
1	A	415	LEU	CA-CB-CG	5.29	127.46	115.30
1	A	591	LEU	CA-CB-CG	5.03	126.87	115.30



There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	426	PRO	Peptide
1	A	531	LYS	Peptide
1	A	561	LEU	Peptide
1	A	649	CYS	Peptide
3	B	228	VAL	Peptide
2	C	266	GLU	Peptide

## 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	A	5266	0	5258	141	0
2	C	1340	0	1365	29	0
3	B	2629	0	2654	53	0
4	C	26	0	0	0	0
5	C	27	0	0	0	0
All	All	9288	0	9277	220	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.

All (220) 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:A:395:SER:O	1:A:399:ASN:CG	1.95	1.04
2:C:182:PHE:O	2:C:184:ARG:N	1.94	0.99
1:A:395:SER:C	1:A:399:ASN:OD1	2.01	0.98
1:A:498:ILE:O	1:A:502:ASP:HB2	1.75	0.85
1:A:358:LEU:HD21	1:A:400:VAL:HG11	1.60	0.82
1:A:358:LEU:HD21	1:A:400:VAL:CG1	2.11	0.81
2:C:183:ARG:HH11	2:C:183:ARG:HG2	1.48	0.77
1:A:395:SER:O	1:A:399:ASN:OD1	2.00	0.77
1:A:395:SER:O	1:A:399:ASN:ND2	2.19	0.75
1:A:358:LEU:HD11	1:A:400:VAL:HG11	1.71	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4:ALA:HB1	1:A:417:SER:HB2	1.71	0.71
1:A:832:PHE:HB3	1:A:837:VAL:HG11	1.73	0.71
1:A:399:ASN:ND2	1:A:399:ASN:H	1.90	0.69
2:C:221:LYS:HD3	2:C:223:ALA:H	1.58	0.68
1:A:808:TRP:HB2	1:A:832:PHE:HA	1.76	0.68
1:A:395:SER:C	1:A:399:ASN:CG	2.48	0.68
1:A:614:ILE:HB	1:A:638:VAL:HG12	1.76	0.66
1:A:443:GLU:HA	1:A:562:ARG:HD2	1.79	0.65
2:C:183:ARG:HD3	2:C:183:ARG:C	2.18	0.64
1:A:361:THR:HG21	1:A:400:VAL:HG12	1.78	0.64
1:A:695:ARG:HH22	1:A:724:TYR:H	1.45	0.64
3:B:110:LEU:O	3:B:114:MET:HB2	1.98	0.64
1:A:2:VAL:HG11	1:A:62:VAL:HG22	1.81	0.63
1:A:571:PHE:HB2	1:A:598:PRO:HG2	1.79	0.63
1:A:716:ILE:HG23	1:A:744:LEU:HD23	1.81	0.62
2:C:183:ARG:HD3	2:C:183:ARG:O	2.00	0.61
1:A:332:PHE:HB2	1:A:337:GLY:HA2	1.83	0.61
1:A:2:VAL:HG22	1:A:66:ARG:HB2	1.83	0.61
2:C:183:ARG:HG2	2:C:183:ARG:NH1	2.16	0.61
1:A:744:LEU:H	1:A:766:LEU:HD21	1.65	0.60
1:A:529:ASN:HB3	1:A:532:LEU:HD23	1.84	0.60
1:A:433:LYS:HA	1:A:436:LEU:HD23	1.83	0.59
1:A:400:VAL:HA	1:A:403:SER:HB3	1.83	0.59
1:A:780:GLN:HB3	1:A:782:PRO:HD2	1.85	0.59
1:A:558:CYS:SG	1:A:559:LYS:N	2.75	0.59
1:A:711:SER:O	1:A:740:GLN:NE2	2.36	0.58
3:B:162:TRP:HE1	3:B:311:GLN:HE21	1.50	0.58
1:A:489:ASP:HA	1:A:492:ARG:HG2	1.86	0.58
1:A:402:SER:C	1:A:404:LEU:H	2.07	0.58
1:A:453:SER:N	1:A:456:GLU:OE2	2.37	0.57
1:A:638:VAL:HA	1:A:662:VAL:HG23	1.86	0.57
3:B:119:ASN:ND2	3:B:174:ASN:OD1	2.37	0.57
1:A:396:GLU:N	1:A:399:ASN:OD1	2.27	0.57
1:A:714:MET:O	1:A:742:HIS:N	2.38	0.57
2:C:183:ARG:HA	2:C:183:ARG:NE	2.18	0.57
3:B:115:SER:HB2	3:B:122:GLN:HG2	1.87	0.56
1:A:803:ASP:OD1	1:A:803:ASP:N	2.36	0.56
3:B:187:ILE:HG22	3:B:215:SER:HA	1.88	0.56
3:B:333:MET:HA	3:B:336:VAL:HG12	1.86	0.56
1:A:741:LEU:HB3	1:A:766:LEU:HD23	1.86	0.56
1:A:28:ARG:HH21	1:A:31:LEU:HD11	1.72	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:66:ARG:NH1	1:A:502:ASP:OD1	2.40	0.55
1:A:655:GLY:N	1:A:679:GLU:OE1	2.38	0.55
1:A:786:ASN:ND2	1:A:789:THR:O	2.39	0.54
1:A:776:LEU:N	1:A:803:ASP:OD2	2.40	0.54
1:A:794:GLU:OE2	1:A:819:ARG:NH1	2.40	0.54
3:B:326:ARG:NH2	3:B:329:ASP:OD2	2.40	0.54
1:A:611:ASN:HA	1:A:635:LYS:HD3	1.89	0.54
1:A:658:VAL:O	1:A:685:ASN:ND2	2.36	0.54
1:A:361:THR:HG21	1:A:400:VAL:CG1	2.38	0.53
3:B:246:THR:H	3:B:249:THR:HG1	1.52	0.53
2:C:187:GLN:HA	2:C:187:GLN:OE1	2.08	0.53
3:B:236:ASP:OD1	3:B:330:ARG:NH1	2.38	0.53
1:A:670:ARG:HB2	1:A:673:ASN:HD22	1.74	0.53
3:B:99:HIS:O	3:B:103:GLU:HB2	2.09	0.53
1:A:101:HIS:HA	1:A:104:ARG:HB2	1.91	0.53
1:A:606:MET:HG3	1:A:609:LEU:HD21	1.89	0.53
1:A:747:GLN:HB2	1:A:772:CYS:HB2	1.91	0.52
1:A:90:GLN:O	1:A:94:ASN:ND2	2.42	0.52
1:A:358:LEU:CD2	1:A:400:VAL:HG11	2.37	0.52
1:A:834:ILE:HD13	1:A:842:GLY:H	1.74	0.52
1:A:616:ASP:OD1	1:A:616:ASP:N	2.42	0.52
1:A:575:LEU:HD23	1:A:578:ILE:HD11	1.92	0.52
3:B:97:LYS:HD2	3:B:99:HIS:HE1	1.74	0.52
1:A:419:ILE:HD13	1:A:465:LEU:HD21	1.92	0.52
1:A:666:PHE:N	1:A:690:GLY:O	2.39	0.52
1:A:402:SER:C	1:A:404:LEU:N	2.64	0.51
1:A:639:LEU:HB3	1:A:663:LEU:HD23	1.93	0.51
2:C:196:LYS:HA	2:C:199:VAL:HG22	1.92	0.51
3:B:258:LEU:HD12	3:B:319:ALA:HB2	1.92	0.51
1:A:16:ILE:HG12	1:A:76:LEU:HD21	1.91	0.51
1:A:41:MET:HG3	1:A:104:ARG:HH21	1.75	0.51
3:B:64:CYS:HB2	3:B:76:ARG:HB2	1.92	0.51
3:B:254:PHE:O	3:B:257:CYS:HB3	2.10	0.51
1:A:799:SER:OG	1:A:800:SER:N	2.43	0.51
1:A:666:PHE:HB3	1:A:691:LEU:HB3	1.92	0.51
1:A:685:ASN:OD1	1:A:712:LYS:NZ	2.42	0.51
1:A:389:GLU:O	1:A:393:ASN:ND2	2.44	0.51
1:A:395:SER:O	1:A:399:ASN:N	2.44	0.51
1:A:719:ASN:OD1	1:A:719:ASN:N	2.43	0.51
1:A:785:GLY:O	1:A:789:THR:OG1	2.28	0.50
2:C:288:GLU:O	2:C:292:GLY:N	2.44	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:222:ARG:NH1	3:B:224:GLU:OE2	2.41	0.50
1:A:11:GLU:OE2	1:A:15:ASN:ND2	2.45	0.50
1:A:73:GLU:OE2	1:A:533:ARG:NH2	2.34	0.50
1:A:438:HIS:HA	1:A:441:ILE:HG22	1.93	0.50
2:C:262:TYR:HA	2:C:284:VAL:HG11	1.93	0.50
3:B:285:GLU:O	3:B:289:ASN:ND2	2.44	0.50
1:A:386:PHE:HD1	1:A:406:LEU:HD21	1.77	0.49
1:A:565:ASP:N	1:A:565:ASP:OD1	2.44	0.49
1:A:668:PRO:HG2	1:A:698:GLN:HB3	1.94	0.49
1:A:721:TYR:OH	3:B:122:GLN:NE2	2.44	0.49
2:C:287:LEU:HD22	2:C:290:ILE:HD11	1.94	0.49
1:A:791:TRP:HB3	1:A:793:ILE:HG23	1.93	0.49
1:A:402:SER:O	1:A:404:LEU:N	2.45	0.49
1:A:713:LEU:HB3	1:A:738:PRO:HG2	1.93	0.49
1:A:723:SER:OG	1:A:725:GLY:O	2.31	0.48
2:C:343:ASN:HA	2:C:346:LEU:HD12	1.96	0.48
1:A:395:SER:HB3	1:A:398:ASP:HB2	1.96	0.48
3:B:71:TYR:HB2	3:B:72:TYR:HD1	1.79	0.48
1:A:677:LEU:N	1:A:703:GLU:OE2	2.42	0.47
2:C:178:GLU:HB2	2:C:182:PHE:HB2	1.96	0.47
3:B:123:LEU:HD23	3:B:125:GLY:H	1.79	0.47
1:A:661:GLU:O	1:A:687:ARG:N	2.38	0.47
3:B:78:GLU:HA	3:B:83:SER:HA	1.96	0.47
1:A:695:ARG:N	1:A:698:GLN:OE1	2.48	0.47
3:B:334:ILE:HD11	3:B:338:LYS:HE2	1.96	0.47
1:A:388:ASP:HA	1:A:391:ARG:HE	1.80	0.47
1:A:647:LEU:HG	1:A:649:CYS:H	1.80	0.47
1:A:695:ARG:NH2	1:A:724:TYR:H	2.12	0.47
3:B:50:PRO:O	3:B:54:LEU:HB2	2.15	0.47
1:A:515:LEU:O	1:A:535:VAL:HA	2.14	0.46
1:A:791:TRP:CD1	1:A:815:MET:HG2	2.50	0.46
1:A:710:LEU:O	1:A:740:GLN:NE2	2.48	0.46
1:A:836:ASP:OD1	1:A:836:ASP:N	2.49	0.46
3:B:84:TYR:HA	3:B:139:PHE:HB2	1.97	0.46
2:C:308:VAL:HG22	2:C:349:LEU:HD23	1.98	0.46
1:A:808:TRP:CE2	1:A:833:ALA:HB2	2.51	0.46
1:A:31:LEU:O	1:A:35:GLN:NE2	2.49	0.45
1:A:710:LEU:HB3	1:A:713:LEU:HB2	1.98	0.45
3:B:159:LEU:HB2	3:B:299:ARG:HH22	1.82	0.45
1:A:649:CYS:HB2	1:A:667:LYS:HB3	1.98	0.45
1:A:754:SER:OG	1:A:780:GLN:OE1	2.26	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:193:LYS:HE2	3:B:195:MET:HB3	1.99	0.45
3:B:258:LEU:O	3:B:261:ILE:HB	2.16	0.45
3:B:82:ARG:NH1	3:B:83:SER:OG	2.50	0.45
2:C:182:PHE:C	2:C:184:ARG:N	2.62	0.45
1:A:371:CYS:SG	1:A:468:ARG:NE	2.88	0.45
2:C:323:ARG:HH22	2:C:332:GLN:HE21	1.63	0.45
3:B:324:LYS:HD2	3:B:329:ASP:HB2	1.99	0.45
1:A:443:GLU:O	1:A:562:ARG:NH1	2.49	0.45
1:A:796:LEU:HB3	1:A:821:VAL:HG22	1.99	0.45
1:A:379:TRP:HA	1:A:382:ILE:HG13	1.99	0.45
1:A:401:MET:O	1:A:494:LEU:HD12	2.16	0.45
1:A:695:ARG:HH12	1:A:725:GLY:H	1.65	0.45
1:A:9:PHE:HD1	1:A:73:GLU:HB3	1.81	0.44
1:A:358:LEU:CD1	1:A:400:VAL:HG11	2.45	0.44
3:B:189:HIS:HA	3:B:213:SER:HA	1.98	0.44
1:A:361:THR:CG2	1:A:400:VAL:HB	2.48	0.44
1:A:382:ILE:HA	1:A:385:HIS:HB2	1.99	0.44
3:B:191:ASP:N	3:B:191:ASP:OD1	2.48	0.44
1:A:752:LYS:O	1:A:777:VAL:N	2.51	0.44
3:B:52:GLN:HB3	3:B:79:ILE:HD12	2.00	0.44
1:A:149:ARG:HH21	1:A:150:TRP:HE1	1.65	0.44
1:A:517:ILE:HG23	1:A:537:SER:HA	2.00	0.44
2:C:179:ASN:HD22	2:C:183:ARG:NH2	2.16	0.44
3:B:298:PRO:HA	3:B:301:MET:HG2	2.00	0.44
1:A:643:ASN:HA	3:B:44:PRO:HG3	1.99	0.44
2:C:187:GLN:OE1	2:C:188:PRO:HD2	2.18	0.44
3:B:318:LEU:HD21	3:B:336:VAL:HG23	2.00	0.44
1:A:695:ARG:HH12	1:A:724:TYR:H	1.66	0.43
3:B:255:GLY:O	3:B:258:LEU:HB3	2.17	0.43
1:A:765:MET:SD	1:A:765:MET:N	2.92	0.43
3:B:166:LEU:HD21	3:B:343:ILE:HD11	1.99	0.43
1:A:524:LYS:HZ1	1:A:526:ILE:HG13	1.84	0.43
3:B:228:VAL:HG23	3:B:239:TYR:CZ	2.53	0.43
3:B:110:LEU:HD21	3:B:187:ILE:HD13	2.01	0.43
1:A:367:GLY:HA2	1:A:370:LEU:HD23	2.00	0.43
3:B:168:ILE:HG22	3:B:205:ALA:HB2	2.01	0.43
1:A:361:THR:HG22	1:A:403:SER:OG	2.18	0.43
2:C:305:TYR:N	2:C:309:ASP:OD2	2.52	0.43
1:A:104:ARG:HA	1:A:107:LEU:HB2	2.00	0.43
1:A:687:ARG:O	1:A:715:SER:N	2.47	0.43
2:C:189:LEU:H	2:C:328:LYS:HZ1	1.66	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:176:VAL:HA	3:B:179:LEU:HD12	2.01	0.42
1:A:650:PHE:HD1	1:A:650:PHE:HA	1.72	0.42
2:C:329:LEU:HB2	2:C:332:GLN:HB2	2.00	0.42
3:B:79:ILE:HG22	3:B:80:GLU:HG3	2.01	0.42
3:B:98:ARG:HA	3:B:101:VAL:HG12	2.01	0.42
3:B:246:THR:OG1	3:B:247:GLU:N	2.50	0.42
1:A:344:LEU:HB3	1:A:379:TRP:CZ3	2.55	0.42
1:A:575:LEU:HD12	1:A:599:LEU:HD13	2.02	0.42
3:B:245:VAL:HG23	3:B:249:THR:HG21	2.01	0.42
1:A:715:SER:HB2	1:A:743:GLU:HB2	2.01	0.42
3:B:43:ILE:HD11	3:B:116:ASN:HD21	1.83	0.42
1:A:694:THR:OG1	1:A:698:GLN:NE2	2.53	0.42
1:A:662:VAL:HG12	1:A:688:LYS:HB2	2.00	0.42
1:A:752:LYS:HA	1:A:776:LEU:HA	2.02	0.41
3:B:54:LEU:HD12	3:B:59:ASN:HD22	1.85	0.41
1:A:545:ASN:OD1	1:A:545:ASN:N	2.53	0.41
1:A:612:LEU:HD22	1:A:612:LEU:HA	1.87	0.41
1:A:654:ILE:HG21	1:A:666:PHE:HE1	1.84	0.41
2:C:293:ARG:HH12	2:C:326:ASP:HA	1.86	0.41
3:B:174:ASN:HA	3:B:177:THR:HG22	2.02	0.41
2:C:172:MET:SD	2:C:172:MET:N	2.94	0.41
2:C:183:ARG:NH1	2:C:183:ARG:CG	2.80	0.41
1:A:80:GLN:HG3	1:A:81:LEU:HD22	2.03	0.41
1:A:759:SER:OG	1:A:762:LYS:N	2.53	0.41
3:B:17:ASP:N	3:B:20:LYS:HZ1	2.17	0.41
1:A:362:ILE:HA	1:A:365:VAL:HG12	2.03	0.41
1:A:477:THR:HG23	1:A:483:ILE:HD11	2.03	0.41
1:A:616:ASP:HB2	1:A:640:ASP:HB2	2.01	0.41
1:A:627:GLN:HG2	1:A:629:CYS:H	1.86	0.41
1:A:741:LEU:HD23	1:A:741:LEU:HA	1.95	0.41
3:B:68:GLN:HA	3:B:73:LYS:HD3	2.03	0.41
3:B:237:PRO:HA	3:B:240:HIS:HB3	2.03	0.41
1:A:401:MET:O	1:A:401:MET:SD	2.79	0.41
1:A:583:ALA:O	1:A:586:GLN:NE2	2.54	0.41
2:C:184:ARG:HA	2:C:184:ARG:HD2	1.88	0.41
2:C:228:ASP:HB2	2:C:232:ASN:HB2	2.03	0.40
3:B:29:ILE:H	3:B:29:ILE:HG13	1.61	0.40
1:A:574:PRO:HA	1:A:598:PRO:HB2	2.03	0.40
3:B:194:PRO:HG2	3:B:260:VAL:HB	2.04	0.40
2:C:281:SER:HA	2:C:284:VAL:HG12	2.03	0.40
1:A:415:LEU:HA	1:A:418:CYS:HB3	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:268:VAL:HG22	3:B:240:HIS:ND1	2.37	0.40
1:A:148:ASP:HB2	1:A:414:HIS:HE1	1.86	0.40
1:A:350:GLU:O	1:A:354:LYS:NZ	2.43	0.40
1:A:530:HIS:CE1	1:A:559:LYS:HD3	2.55	0.40
1:A:713:LEU:HD22	1:A:714:MET:H	1.87	0.40

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	A	657/852 (77%)	553 (84%)	103 (16%)	1 (0%)	47	79
2	C	162/426 (38%)	137 (85%)	23 (14%)	2 (1%)	13	49
3	B	323/351 (92%)	284 (88%)	38 (12%)	1 (0%)	41	75
All	All	1142/1629 (70%)	974 (85%)	164 (14%)	4 (0%)	38	71

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	183	ARG
1	A	403	SER
2	C	173	PRO
3	B	236	ASP

### 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	A	603/772 (78%)	583 (97%)	20 (3%)	38	63
2	C	139/355 (39%)	131 (94%)	8 (6%)	20	50
3	B	293/314 (93%)	282 (96%)	11 (4%)	33	59
All	All	1035/1441 (72%)	996 (96%)	39 (4%)	36	59

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	29	LYS
1	A	45	LEU
1	A	50	ARG
1	A	91	ARG
1	A	329	ASN
1	A	381	ARG
1	A	399	ASN
1	A	401	MET
1	A	449	ARG
1	A	452	ARG
1	A	487	ILE
1	A	490	MET
1	A	561	LEU
1	A	582	ILE
1	A	604	ARG
1	A	612	LEU
1	A	662	VAL
1	A	731	LYS
1	A	763	LEU
1	A	765	MET
2	C	183	ARG
2	C	184	ARG
2	C	187	GLN
2	C	194	ARG
2	C	255	LYS
2	C	294	ARG
2	C	323	ARG
2	C	325	MET
3	B	39	ASN
3	B	46	ARG
3	B	98	ARG
3	B	170	LYS

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Mol	Chain	Res	Type
3	B	190	ARG
3	B	192	VAL
3	B	201	LYS
3	B	220	LYS
3	B	222	ARG
3	B	309	ARG
3	B	340	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	30	GLN
1	A	35	GLN
1	A	51	GLN
1	A	94	ASN
1	A	329	ASN
1	A	414	HIS
1	A	530	HIS
1	A	611	ASN
1	A	625	GLN
1	A	643	ASN
1	A	673	ASN
1	A	812	GLN
3	B	39	ASN
3	B	59	ASN
3	B	99	HIS
3	B	122	GLN
3	B	240	HIS
3	B	311	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
4	BQL	C	501	2,5	26,27,27	1.12	2 (7%)	34,39,39	1.71	8 (23%)
5	BQO	C	502	2,4	26,28,28	1.79	8 (30%)	35,41,41	1.68	9 (25%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	BQL	C	501	2,5	-	8/15/34/34	0/2/2/2
5	BQO	C	502	2,4	-	9/19/37/37	0/2/2/2

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	502	BQO	C5-C4	-3.52	1.35	1.43
5	C	502	BQO	C4-N3	-3.25	1.32	1.38
5	C	502	BQO	O4-C4	-3.01	1.18	1.24
5	C	502	BQO	O4'-C1'	2.54	1.48	1.42
4	C	501	BQL	C2-N1	2.39	1.42	1.38
5	C	502	BQO	O2-C2	-2.25	1.18	1.23
5	C	502	BQO	C3'-C2'	-2.20	1.47	1.53
5	C	502	BQO	C6-N1	-2.10	1.32	1.38
5	C	502	BQO	P-OP3	2.07	1.65	1.55
4	C	501	BQL	C4-N3	-2.02	1.34	1.38

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	502	BQO	C4-N3-C2	-4.79	120.26	126.58
4	C	501	BQL	C4-N3-C2	-3.99	121.31	126.58
4	C	501	BQL	C5-C4-N3	3.71	120.39	114.84
5	C	502	BQO	C5-C4-N3	3.58	120.20	114.84
5	C	502	BQO	N3-C2-N1	3.55	119.61	114.89
4	C	501	BQL	C1'-N1-C2	3.54	123.98	117.57
4	C	501	BQL	O4-C4-C5	-3.41	119.17	125.16
4	C	501	BQL	N3-C2-N1	3.30	119.27	114.89
5	C	502	BQO	O4-C4-C5	-3.06	119.77	125.16
4	C	501	BQL	OP3-CB-CA	2.67	110.75	108.14
5	C	502	BQO	O-C-CA	-2.67	117.77	124.78
5	C	502	BQO	C3'-C2'-C1'	2.39	105.96	101.43
4	C	501	BQL	C2'-C3'-C3	2.26	107.04	102.64
5	C	502	BQO	C3-O4'-C1'	-2.18	104.65	109.47
5	C	502	BQO	P-O5'-C1	-2.16	108.99	121.68
4	C	501	BQL	C1'-N1-C6	-2.07	116.34	120.84
5	C	502	BQO	O2-C2-N1	-2.03	120.09	122.79

There are no chirality outliers.

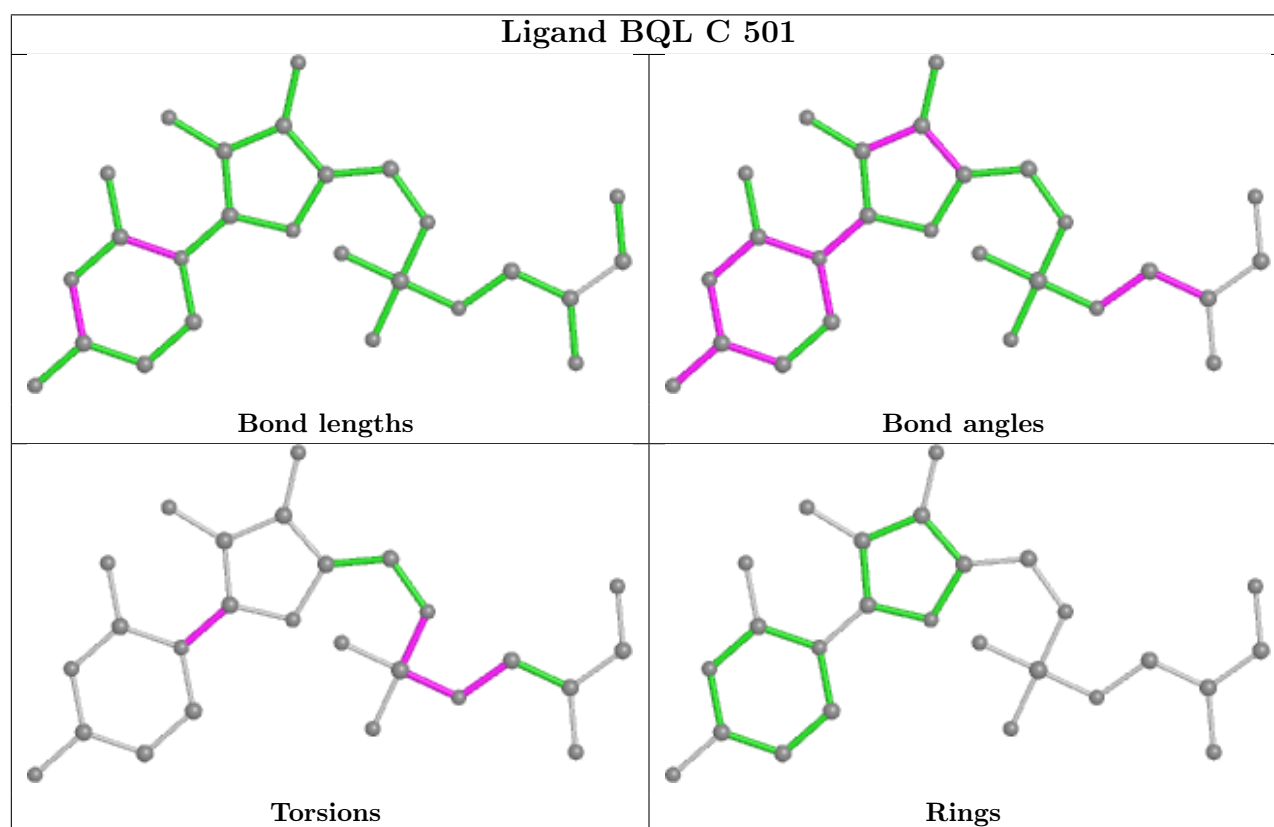
All (17) torsion outliers are listed below:

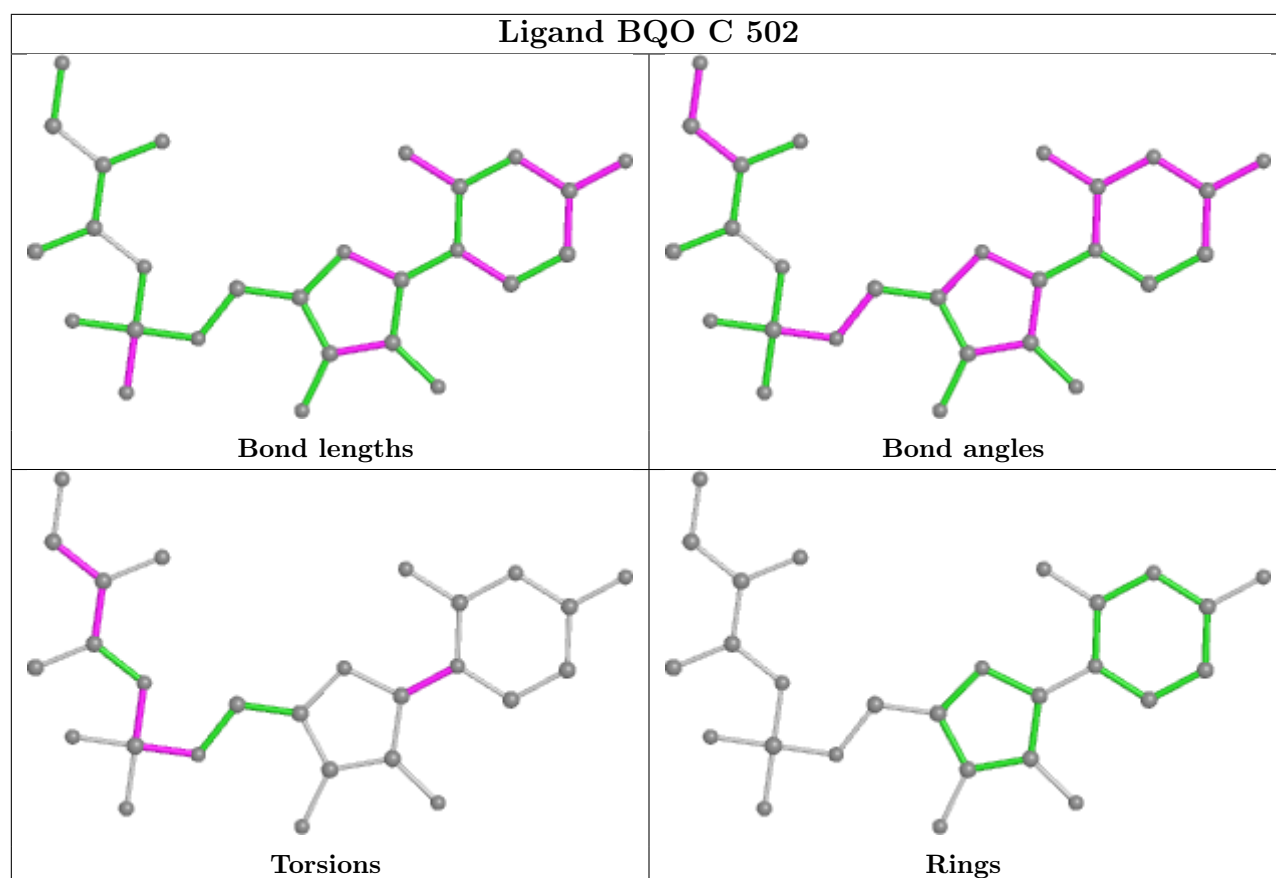
Mol	Chain	Res	Type	Atoms
4	C	501	BQL	CA-CB-OP3-P
4	C	501	BQL	O4'-C1'-N1-C2
4	C	501	BQL	O4'-C1'-N1-C6
4	C	501	BQL	C5'-O5'-P-OP2
4	C	501	BQL	C5'-O5'-P-OP3
4	C	501	BQL	CB-OP3-P-O5'
4	C	501	BQL	CB-OP3-P-OP1
4	C	501	BQL	CB-OP3-P-OP2
5	C	502	BQO	N-CA-CB-OP1
5	C	502	BQO	C-CA-CB-CG2
5	C	502	BQO	CB-OP1-P-O5'
5	C	502	BQO	N-CA-CB-CG2
5	C	502	BQO	C2'-C1'-N1-C6
5	C	502	BQO	O4'-C1'-N1-C6
5	C	502	BQO	C1-O5'-P-OP2
5	C	502	BQO	O4'-C1'-N1-C2
5	C	502	BQO	O-C-CA-CB

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





## 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.

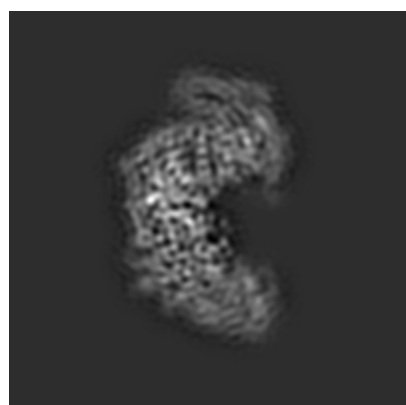
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-0681. These allow visual inspection of the internal detail of the map and identification of artifacts.

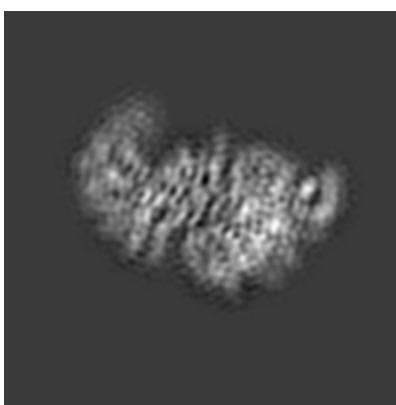
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

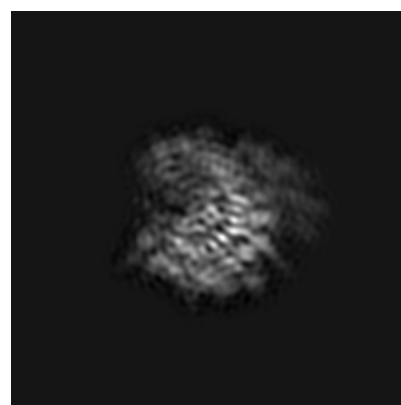
#### 6.1.1 Primary map



X



Y

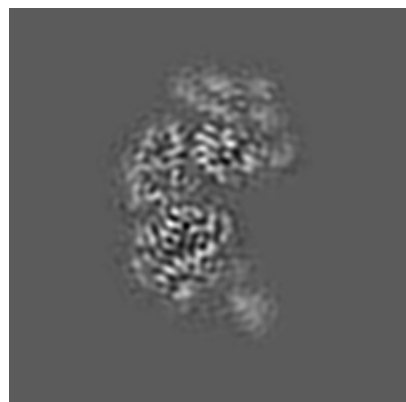


Z

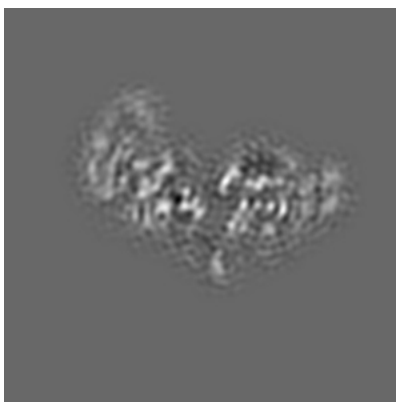
The images above show the map projected in three orthogonal directions.

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

#### 6.2.1 Primary map



X Index: 80



Y Index: 80

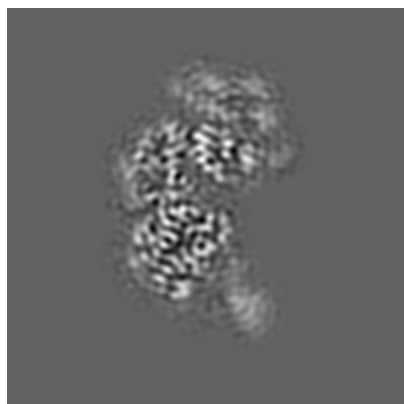


Z Index: 80

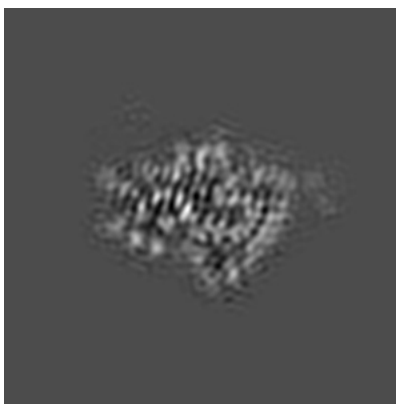
The images above show central slices of the map in three orthogonal directions.

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

### 6.3.1 Primary map



X Index: 81



Y Index: 64



Z Index: 92

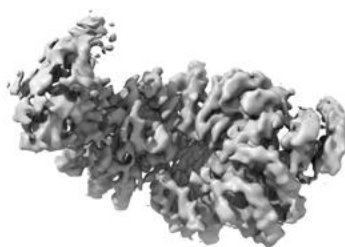
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

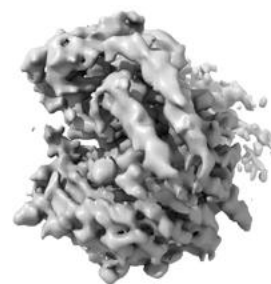
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

## 6.5 Mask visualisation

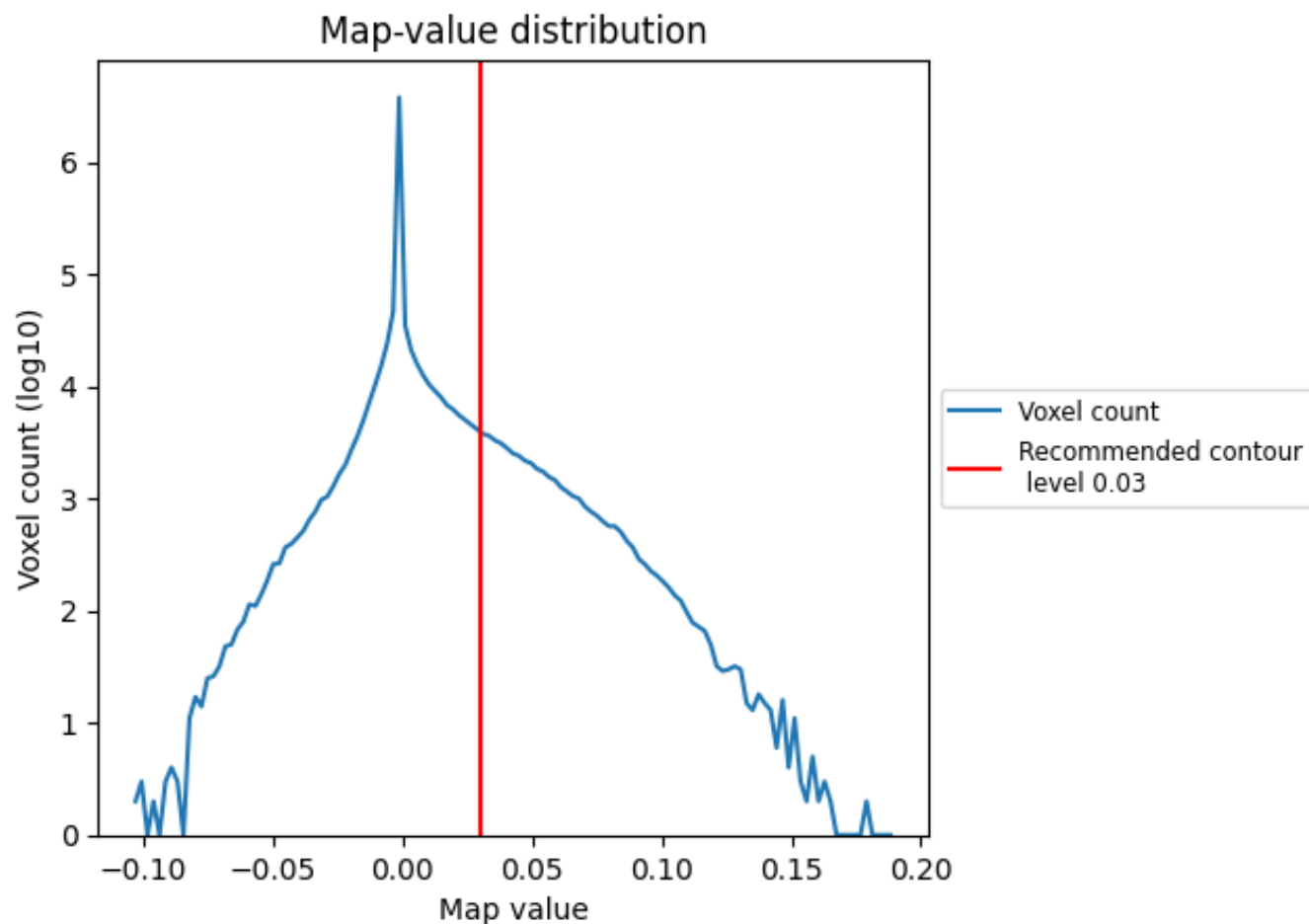
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

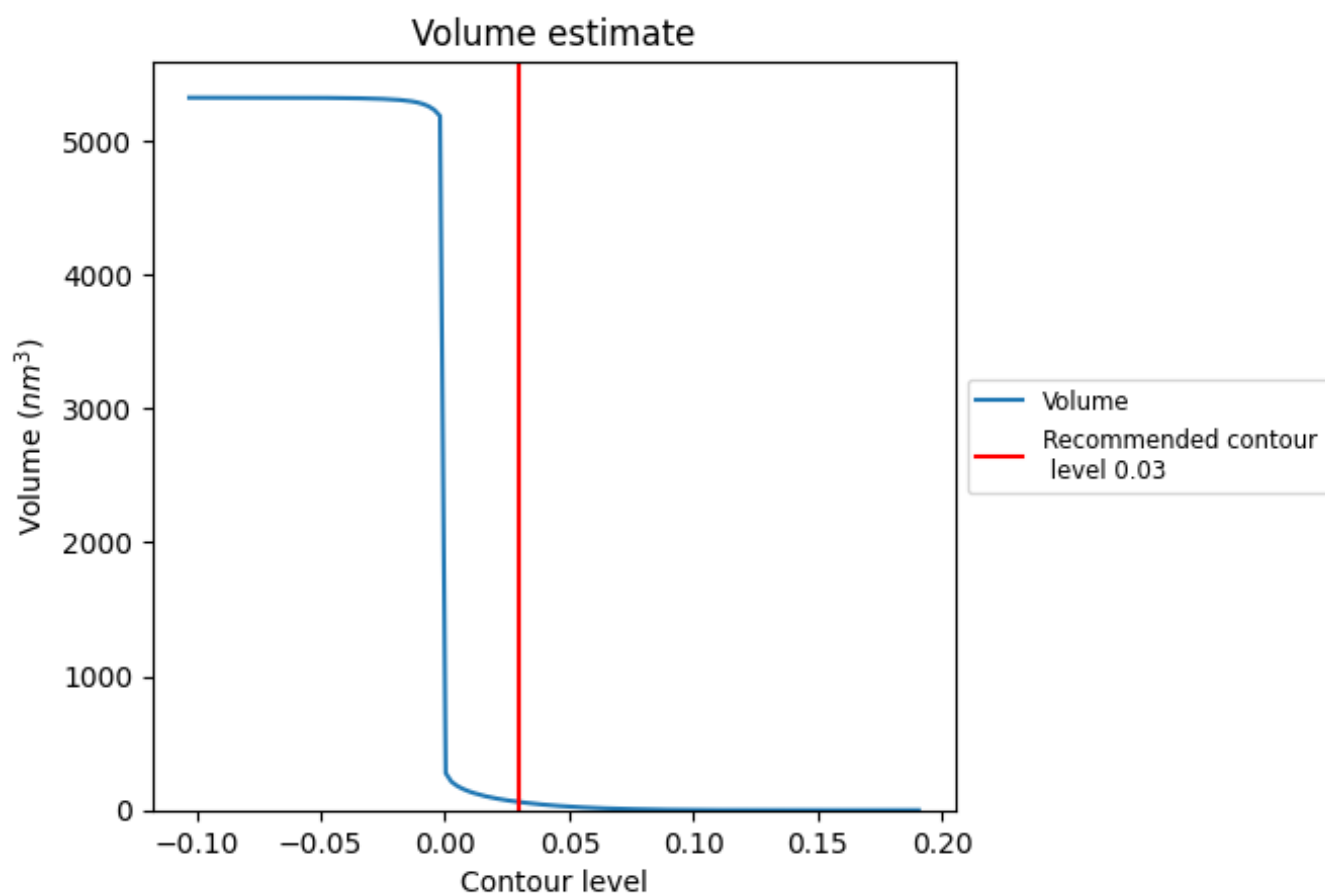
This section contains the results of statistical analysis of the map.

### 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.

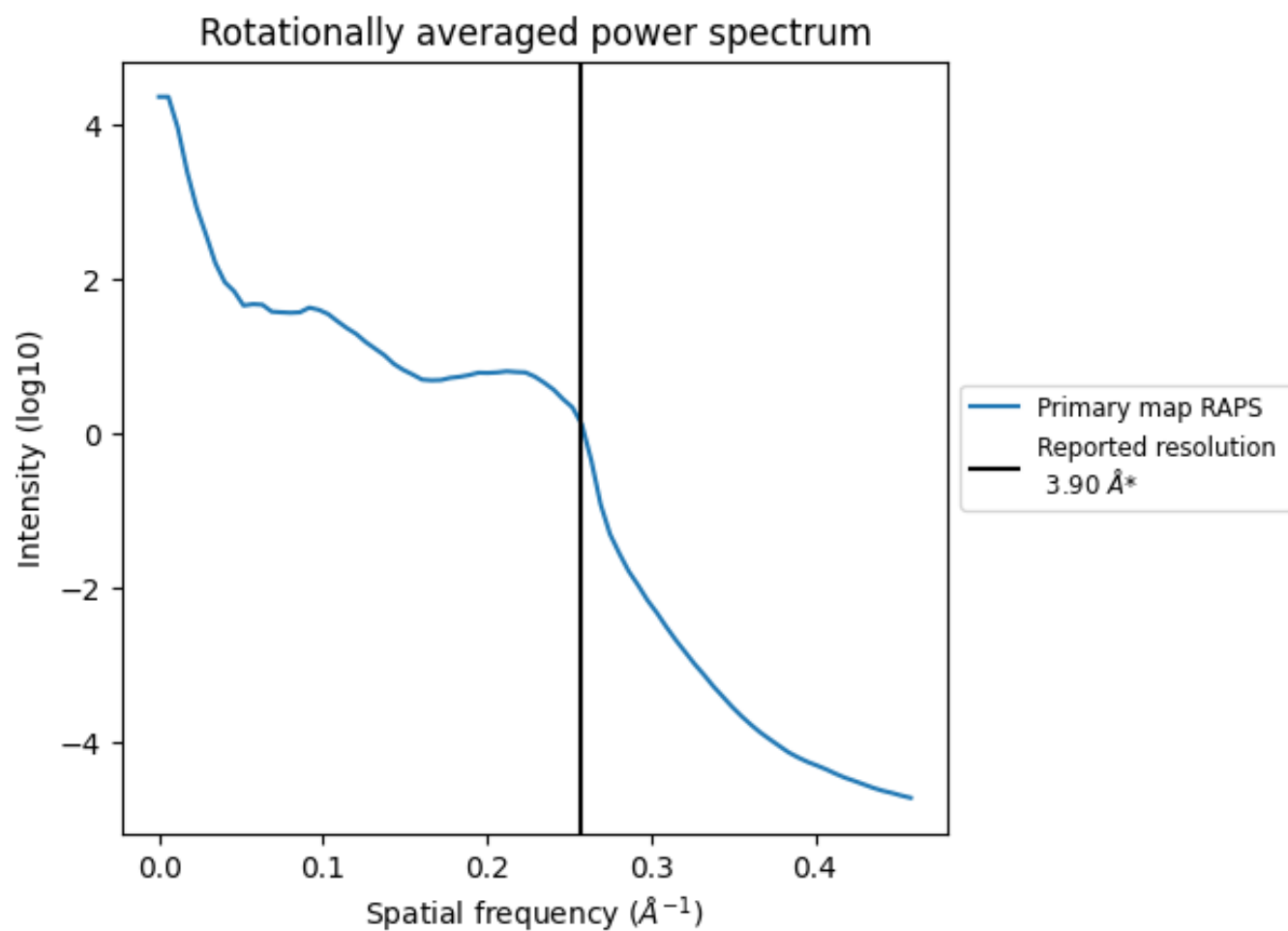
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 60 nm<sup>3</sup>; this corresponds to an approximate mass of 55 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 ⓘ



\*Reported resolution corresponds to spatial frequency of 0.256 Å<sup>-1</sup>

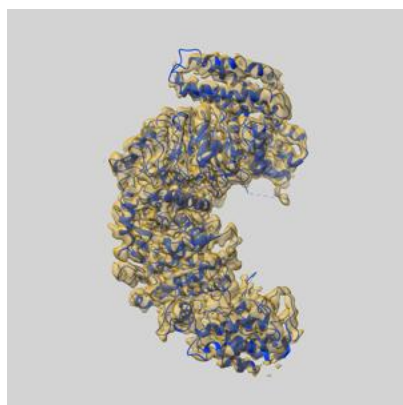
## 8 Fourier-Shell correlation

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

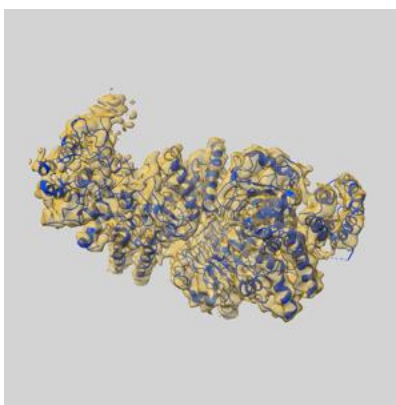
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-0681 and PDB model 6J5U. Per-residue inclusion information can be found in [section 3](#) on [page 5](#).

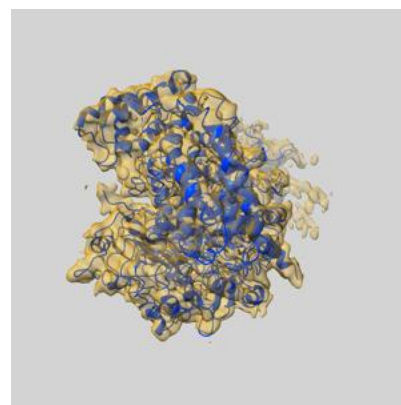
### 9.1 Map-model overlay [i](#)



X



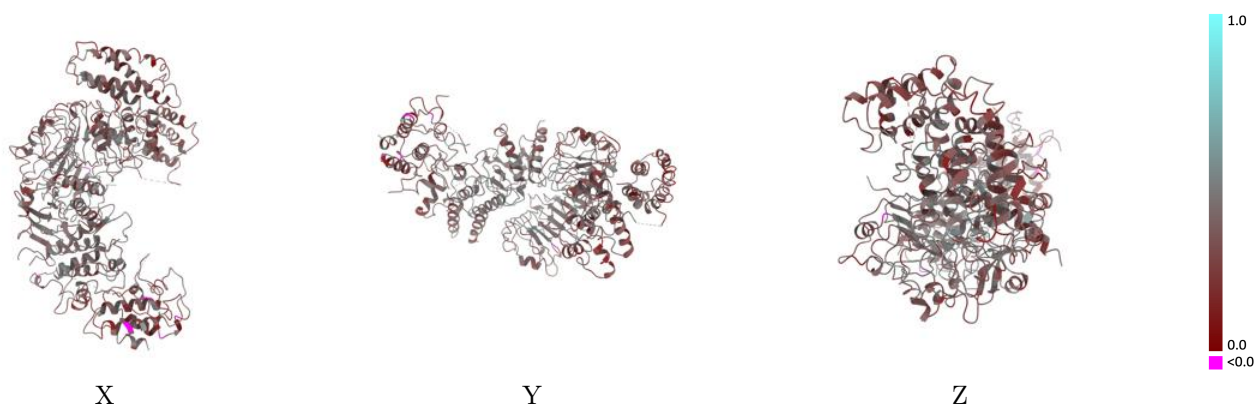
Y



Z

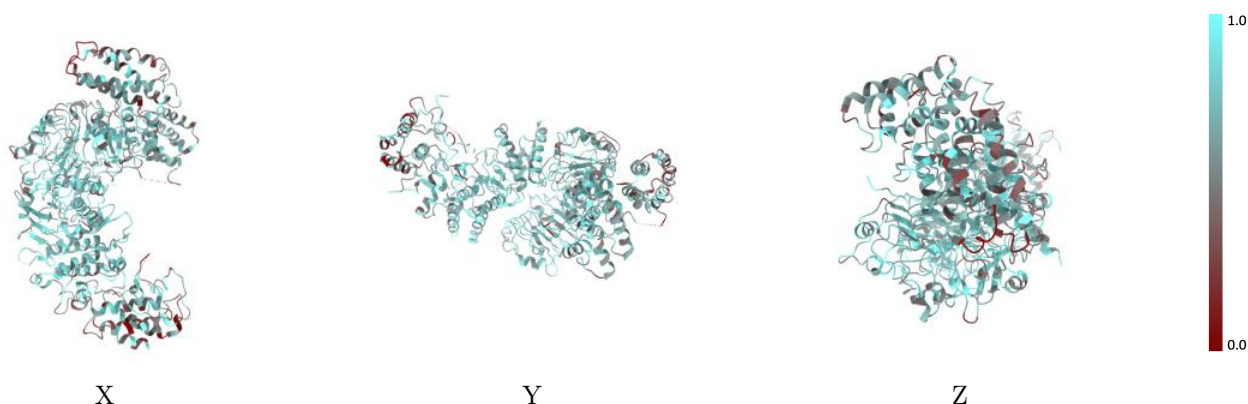
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



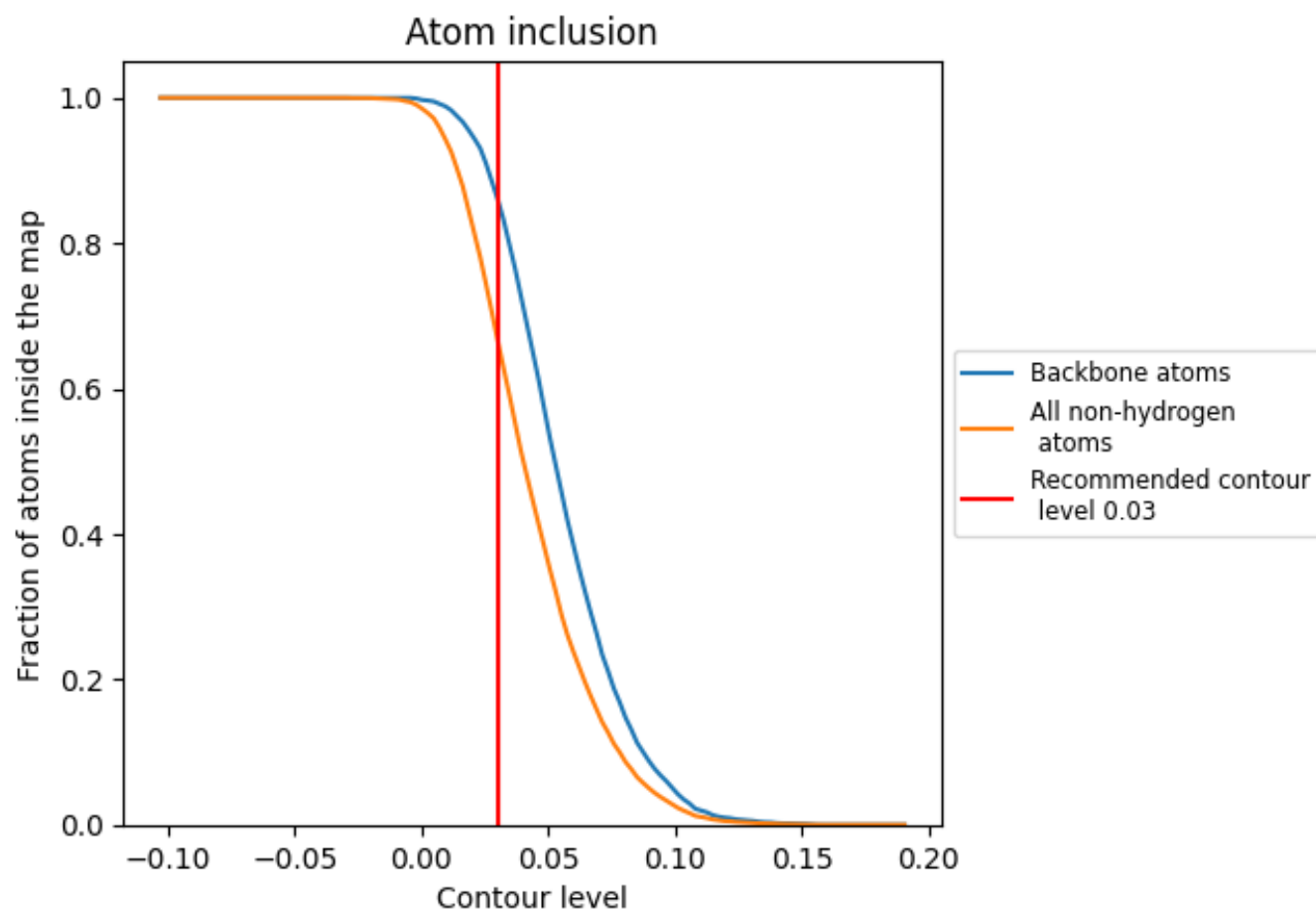
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.03).

## 9.4 Atom inclusion ⓘ



At the recommended contour level, 86% of all backbone atoms, 67% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.6682	<div></div> 0.3650
A	<div></div> 0.6597	<div></div> 0.3590
B	<div></div> 0.7407	<div></div> 0.3980
C	<div></div> 0.5637	<div></div> 0.3280

