



Full wwPDB EM Validation Report ⓘ

Jun 27, 2024 – 01:35 PM JST

PDB ID : 8XJ8
EMDB ID : EMD-38396
Title : The Cryo-EM structure of MPXV E5 C-terminal in complex with DNA
Authors : Zhang, W.; Liu, Y.; Gao, H.; Gan, J.
Deposited on : 2023-12-20
Resolution : 2.67 Å (reported)

This is a Full wwPDB EM Validation 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:

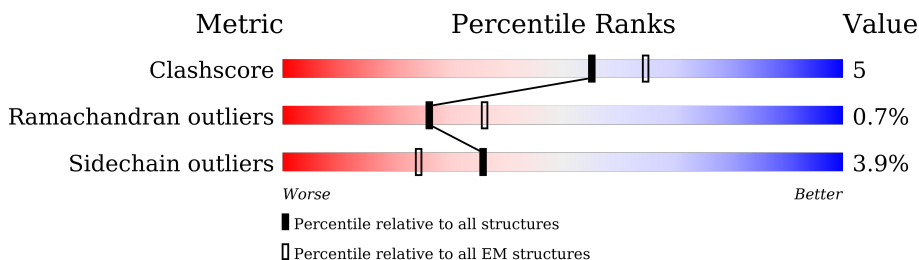
EMDB validation analysis : 0.0.1.dev92
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (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 2.67 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	X	70	
2	A	463	
2	B	463	
2	C	463	
2	D	463	
2	E	463	
2	F	463	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 15904 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.

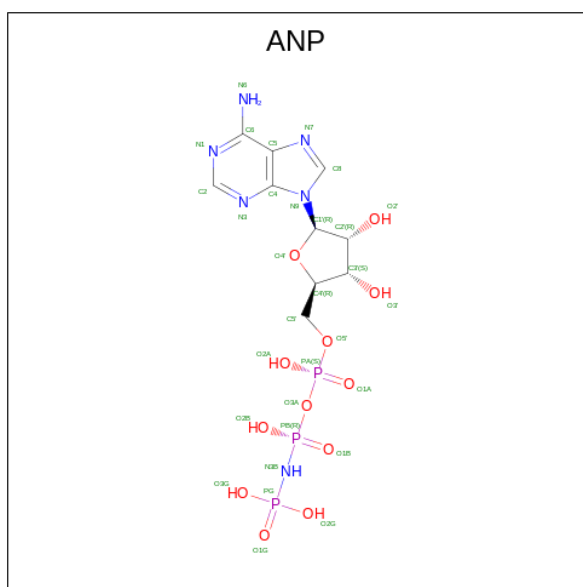
- Molecule 1 is a DNA chain called DNA (70-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	X	6	120	60	12	42	6	0	0

- Molecule 2 is a protein called Monkeypox virus E5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	422	3427	2196	581	634	16	0	0
2	B	372	2990	1902	512	560	16	0	0
2	C	379	3053	1950	519	568	16	0	0
2	D	353	2846	1823	484	524	15	0	0
2	E	123	979	629	167	179	4	0	0
2	F	308	2393	1537	398	447	11	0	0

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (three-letter code: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
3	A	1	Total	C	N	O	P	0
			31	10	6	12	3	
3	B	1	Total	C	N	O	P	0
			31	10	6	12	3	
3	C	1	Total	C	N	O	P	0
			31	10	6	12	3	

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

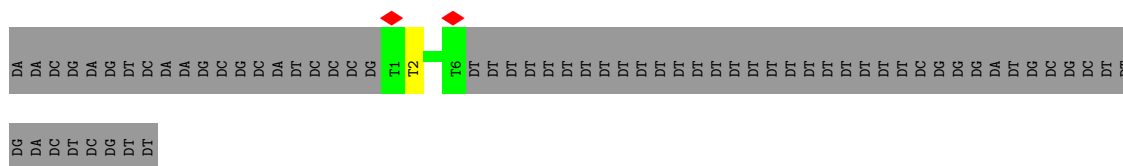
Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
4	A	1	Total	Mg	0
			1	1	
4	B	1	Total	Mg	0
			1	1	
4	C	1	Total	Mg	0
			1	1	

3 Residue-property plots [i](#)


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.

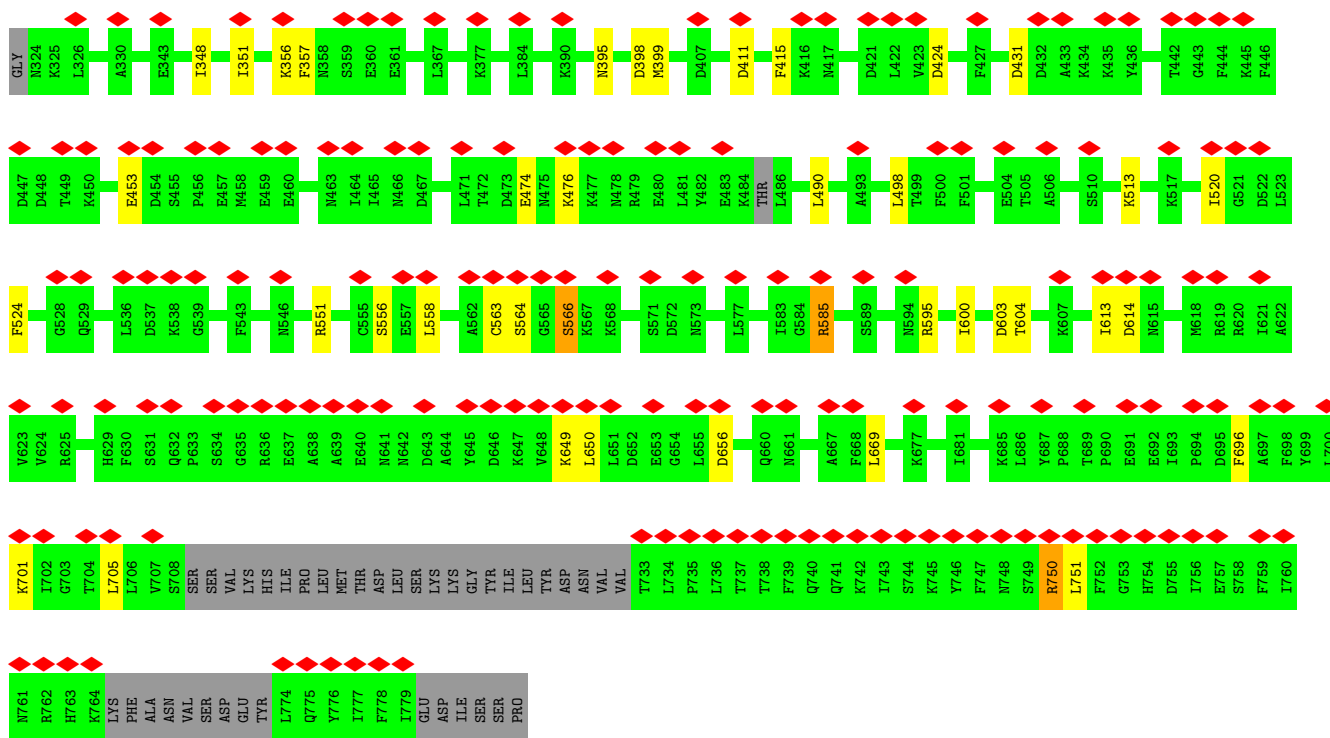
- Molecule 1: DNA (70-MER)

Chain X:  7% . 91%

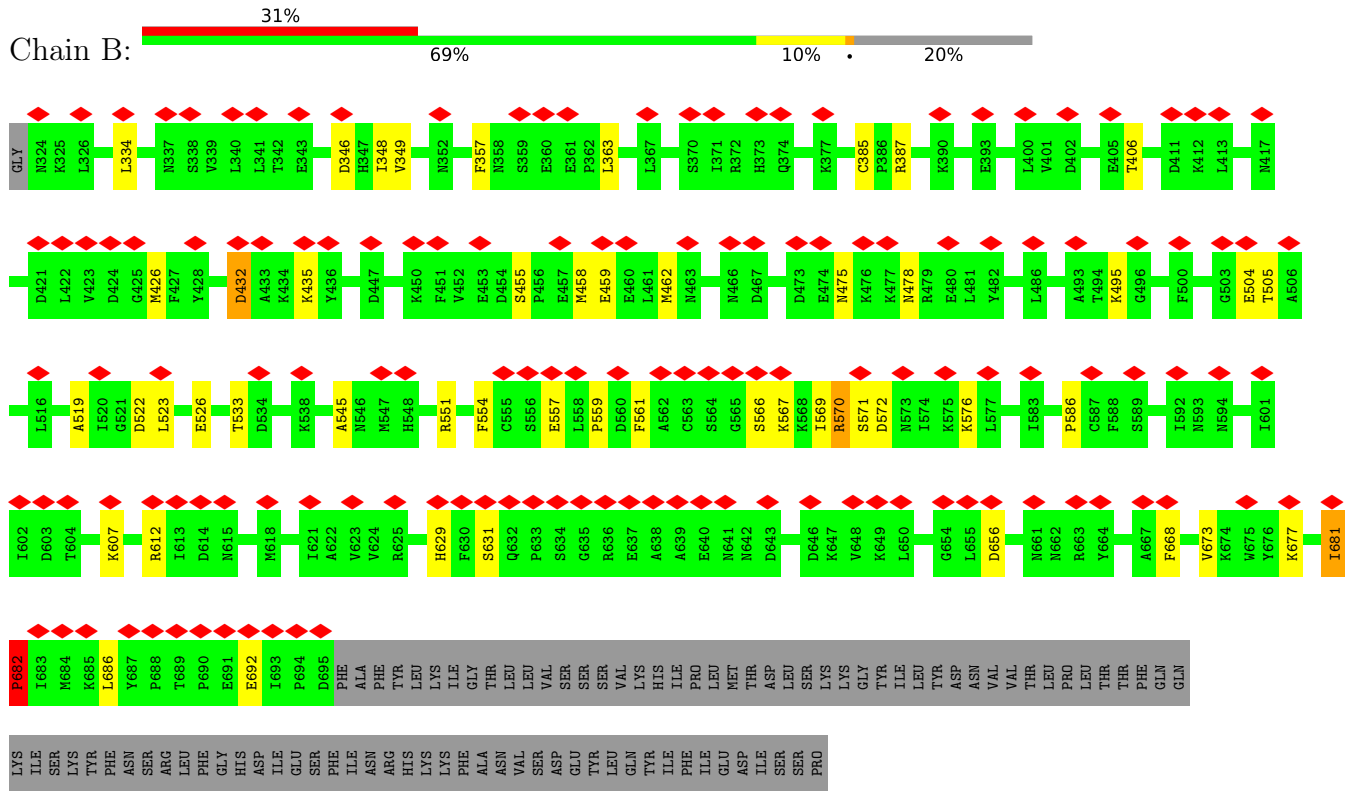


- Molecule 2: Monkeypox virus E5

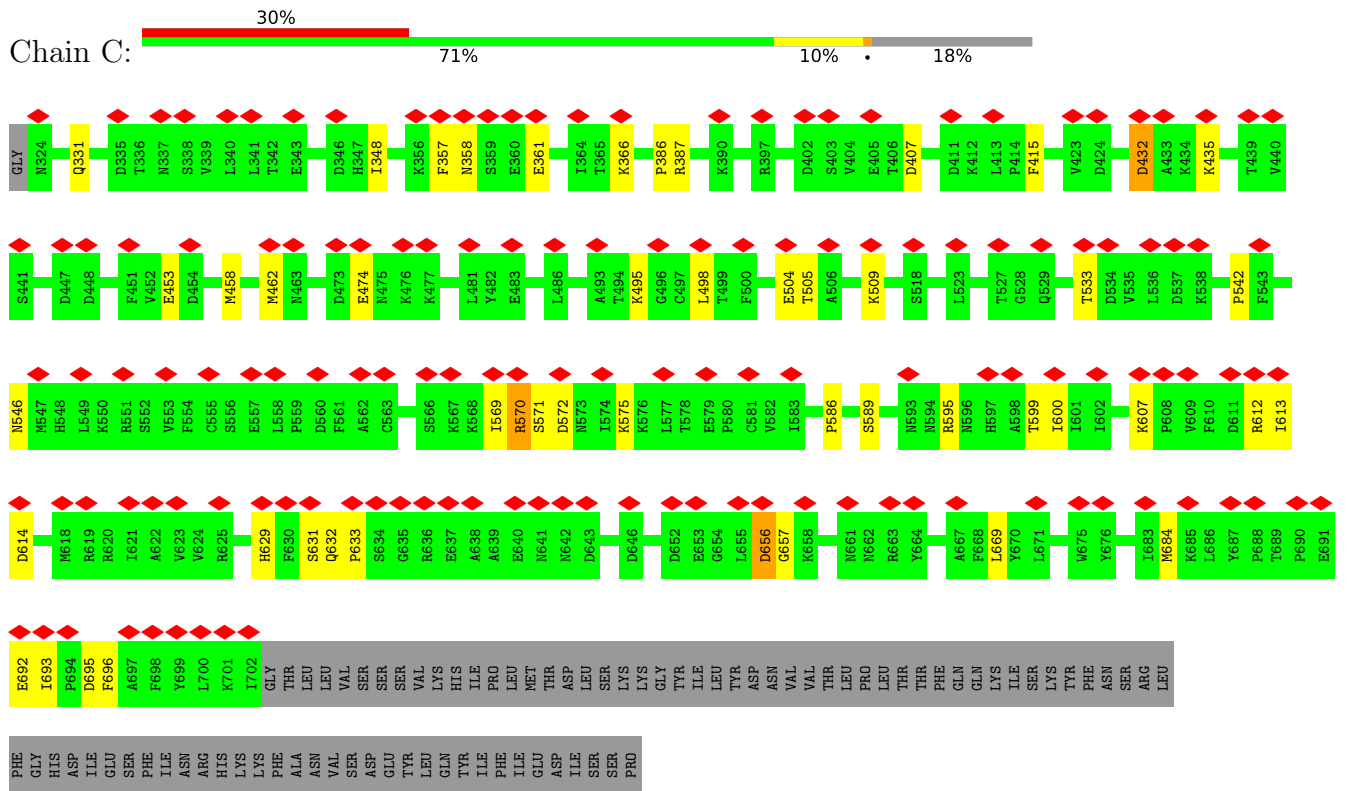
Chain A:  37% 82% 8% . 9%



- Molecule 2: Monkeypox virus E5



• Molecule 2: Monkeypox virus E5



• Molecule 2: Monkeypox virus E5



THR	GLY	RG24	S429	C491	F554	I613	V673	THR
LEU	RG33	G430	G430	G492	C555	D614	KG74	LEU
LEU	I333	D431	G431	A493	S556	RG15	KG75	PRO
THR	T336	D432	D432	T494	E557	A616	KG77	THR
THR	N337	A433	K434	K495	L558	L617	KG78	PHE
GLN	E343	K435	K435	G496	P559	RG19	V679	GLN
GLN	R344	Y436	Y436	C497	D560	RG20	H680	LYS
LYS	G345	V440	V440	L498	F561	RG21	P681	LYS
LYS	D346	S441	S441	T499	A562	I621	P682	SER
LYS	H347	F500	F500	F501	CYS	A622	I681	LYS
TYR	I348	T442	T442	F502	SER	V623	I683	TYR
ASN	V349	G443	G443	G503	GLY	V624	KG84	PHE
ASN	W350	F444	F444	E504	SER	RG25	LYS	ASN
LEU	I351	K445	K445	T505	KG567	F626	LEU	SER
THR	N352	F446	F446	T506	K568	RG27	PRO	ARG
THR	N353	D447	D447	A506	I569	T628	THR	LEU
GLY	S354	D448	D448	T507	R570	H629	PRO	PHE
ASP	F357	T449	T449	G508	S571	PHE	GLU	HIS
GLU	N358	K450	K450	K509	D572	SER	GLU	GLY
ILE	N359	F451	F451	S510	N573	GLN	ILE	ILE
ASP	E360	V452	V452	T511	I574	PRO	PRO	PRO
PHE	E361	V453	V453	T512	K575	SER	ASP	ASP
ALA	P362	D454	D454	T513	K576	GLY	PHE	PHE
LYS	T365	K455	K455	R514	L577	ARG	ALA	ASN
ILE	K366	P456	P456	R515	T578	ALA	ALA	TYR
GLY	K377	E457	E457	L516	E579	GLU	ALA	LEU
THR	R389	M458	M458	K517	PRO	ASN	ALA	LEU
LEU	K390	E459	E459	S518	CYS	ASN	ALA	LEU
VAL	T391	E460	E460	A519	VAL	ASP	ALA	LEU
TYR	A394	L461	L461	I520	ILE	TYR	ALA	LEU
GLN	S403	M462	M462	G521	ARG	ASP	ALA	LEU
TYR	V404	I464	I464	D522	PRO	LYS	ALA	LEU
ILE	E405	I465	I465	L523	CYS	VAL	ALA	LEU
GLU	T406	I466	I466	F524	PHE	LYS	ALA	LEU
GLU	D407	I467	I467	V525	SER	LEU	ALA	LEU
THR	T408	I468	I468	E526	ASN	LEU	ALA	LEU
THR	D411	I469	I469	T527	ASN	GLY	ALA	LEU
LYS	K412	Q469	Q469	G528	ASN	GLY	ALA	LEU
GLY	L413	P470	P470	Q529	ARG	L655	ALA	LEU
TYR	P414	L471	L471	I531	ARG	D656	ALA	LEU
ILE	F415	T472	T472	L532	H597	G657	ALA	LEU
ILE	K416	D473	D473	T533	A598	KG58	ALA	LEU
ASP	L420	E474	E474	D534	T599	I659	ALA	LEU
ASN	D421	I475	I475	VAL	I600	Q660	ALA	LEU
ASN	L422	K476	K476	LEU	I601	RG61	ALA	LEU
VAL	V423	M477	M477	ASP	D603	H662	ALA	LEU
VAL	D424	R478	R478	LYS	T604	R663	ALA	LEU
GLY	G425	M479	M479	LYS	F666	Y664	ALA	LEU
GLY	M426	E480	E480	PRO	A667	R665	ALA	LEU
GLY	L486	L481	L481	PRO	F668	F666	ALA	LEU
GLY	S487	Y482	Y482	PRO	L669	A667	ALA	LEU
GLY	C488	E483	E483	PRO	Y670	L669	ALA	LEU
GLY	L489	M483	M483	PRO	L671	L671	ALA	LEU
GLY				PRO	L672	L672	ALA	LEU
GLY				PRO			ALA	LEU

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	247898	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50.0	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	8.140	Depositor
Minimum map value	-3.638	Depositor
Average map value	-0.002	Depositor
Map value standard deviation	0.159	Depositor
Recommended contour level	0.733	Depositor
Map size (\AA)	302.68, 302.68, 302.68	wwPDB
Map dimensions	280, 280, 280	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.081, 1.081, 1.081	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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	X	0.44	0/131	1.25	0/200
2	A	0.24	0/3498	0.46	0/4718
2	B	0.30	0/3050	0.53	2/4119 (0.0%)
2	C	0.24	0/3117	0.50	0/4210
2	D	0.25	0/2905	0.48	0/3924
2	E	0.24	0/999	0.48	0/1353
2	F	0.26	0/2437	0.52	0/3301
All	All	0.26	0/16137	0.51	2/21825 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
2	B	682	PRO	N-CA-CB	7.33	112.09	103.30
2	B	682	PRO	N-CA-C	-6.20	95.97	112.10

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	X	120	0	73	1	0
2	A	3427	0	3451	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	2990	0	3000	27	0
2	C	3053	0	3070	28	0
2	D	2846	0	2857	33	0
2	E	979	0	982	14	0
2	F	2393	0	2322	54	0
3	A	31	0	13	0	0
3	B	31	0	13	0	0
3	C	31	0	13	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
All	All	15904	0	15794	168	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 5.

All (168) 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)
2:F:343:GLU:N	2:F:343:GLU:OE1	2.19	0.75
2:D:504:GLU:O	2:D:509:LYS:NZ	2.28	0.67
2:D:361:GLU:N	2:D:361:GLU:OE1	2.28	0.66
2:F:453:GLU:HA	2:F:670:TYR:CE2	2.30	0.66
2:C:542:PRO:O	2:C:546:ASN:ND2	2.30	0.65
2:F:655:LEU:O	2:F:659:ILE:N	2.29	0.65
2:F:574:ILE:H	2:F:574:ILE:HD12	1.63	0.64
1:X:2:DT:OP1	2:A:585:ARG:NH2	2.31	0.63
2:E:378:GLU:OE1	2:E:378:GLU:N	2.29	0.62
2:C:386:PRO:HD2	2:C:387:ARG:HH21	1.65	0.61
2:F:459:GLU:N	2:F:459:GLU:OE2	2.33	0.61
2:A:513:LYS:NZ	2:A:556:SER:OG	2.33	0.61
2:F:348:ILE:HG22	2:F:357:PHE:HB2	1.83	0.61
2:F:432:ASP:N	2:F:432:ASP:OD1	2.32	0.60
2:B:571:SER:OG	2:B:612:ARG:O	2.21	0.58
2:D:349:VAL:HG21	2:D:363:LEU:HB3	1.85	0.58
2:C:656:ASP:OD1	2:C:657:GLY:N	2.35	0.58
2:E:402:ASP:OD1	2:E:402:ASP:N	2.33	0.58
2:E:387:ARG:H	2:E:387:ARG:HD2	1.69	0.57
2:F:479:ARG:O	2:F:483:GLU:HG3	2.05	0.57
2:F:664:TYR:O	2:F:666:PHE:N	2.37	0.57
2:D:359:SER:OG	2:D:360:GLU:OE1	2.18	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:476:LYS:O	2:F:480:GLU:HG2	2.04	0.56
2:E:414:PRO:HG2	2:E:441:SER:HA	1.88	0.56
2:C:632:GLN:HG3	2:C:633:PRO:HD2	1.88	0.56
2:F:459:GLU:HA	2:F:462:MET:HG2	1.87	0.56
2:B:673:VAL:HG12	2:B:677:LYS:HE3	1.88	0.56
2:D:498:LEU:HG	2:D:600:ILE:HB	1.88	0.56
2:F:571:SER:H	2:F:611:ASP:HB3	1.69	0.56
2:B:348:ILE:HG22	2:B:357:PHE:HB2	1.86	0.55
2:A:348:ILE:HG22	2:A:357:PHE:HB3	1.88	0.55
2:C:348:ILE:HG22	2:C:357:PHE:HB3	1.90	0.54
2:D:534:ASP:O	2:D:573:ASN:ND2	2.32	0.54
2:D:612:ARG:NH1	2:D:613:ILE:O	2.40	0.54
2:B:455:SER:O	2:B:459:GLU:OE2	2.26	0.54
2:F:562:ALA:HB2	2:F:609:VAL:HG21	1.91	0.53
2:C:474:GLU:N	2:C:474:GLU:OE2	2.41	0.53
2:B:523:LEU:HD13	2:B:551:ARG:HD2	1.91	0.53
2:B:607:LYS:NZ	2:B:692:GLU:O	2.40	0.52
2:D:361:GLU:HG2	2:D:363:LEU:HG	1.91	0.52
2:A:564:SER:OG	2:A:566:SER:OG	2.28	0.52
2:C:612:ARG:NH1	2:C:613:ILE:O	2.43	0.52
2:D:417:ASN:N	2:D:417:ASN:OD1	2.43	0.52
2:D:528:GLY:O	2:D:529:GLN:NE2	2.43	0.51
2:F:490:LEU:HD11	2:F:672:LEU:HB3	1.92	0.51
2:A:395:ASN:O	2:A:399:MET:HG3	2.11	0.51
2:B:504:GLU:HG3	2:B:505:THR:H	1.76	0.50
2:C:569:ILE:O	2:C:570:ARG:HB2	2.12	0.50
2:A:351:ILE:O	2:A:356:LYS:NZ	2.45	0.50
2:E:423:VAL:HG13	2:E:424:ASP:OD1	2.12	0.50
2:C:504:GLU:O	2:C:509:LYS:NZ	2.44	0.50
2:B:557:GLU:HG2	2:C:575:LYS:HB3	1.93	0.50
2:B:569:ILE:O	2:B:570:ARG:HB2	2.12	0.50
2:F:495:LYS:NZ	2:F:597:HIS:O	2.37	0.50
2:C:415:PHE:HZ	2:C:669:LEU:HD21	1.76	0.49
2:D:625:ARG:HD3	2:D:627:ARG:HH21	1.78	0.49
2:C:366:LYS:HG2	2:D:398:ASP:HA	1.95	0.49
2:F:467:ASP:OD1	2:F:468:ILE:HD12	2.13	0.49
2:F:486:LEU:HD21	2:F:668:PHE:CZ	2.48	0.49
2:A:398:ASP:OD2	2:F:389:ARG:NH2	2.45	0.49
2:D:478:ASN:HD21	2:D:625:ARG:H	1.61	0.49
2:F:495:LYS:HE3	2:F:599:THR:HG22	1.95	0.49
2:B:458:MET:O	2:B:462:MET:HG2	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:354:SER:OG	2:D:356:LYS:NZ	2.44	0.48
2:D:375:LEU:HD23	2:D:379:TYR:HB3	1.94	0.48
2:C:498:LEU:HD22	2:C:600:ILE:HB	1.96	0.48
2:F:509:LYS:NZ	2:F:604:THR:O	2.47	0.48
2:F:670:TYR:CE1	2:F:674:LYS:HG3	2.49	0.48
2:D:571:SER:O	2:D:574:ILE:HG13	2.14	0.47
2:A:498:LEU:HG	2:A:600:ILE:HB	1.96	0.47
2:A:750:ARG:NH1	2:A:751:LEU:HB2	2.30	0.47
2:A:613:ILE:HD12	2:A:696:PHE:HE1	1.80	0.47
2:E:420:LEU:HA	2:E:427:PHE:HA	1.96	0.47
2:F:350:TRP:CD2	2:F:434:LYS:HG3	2.49	0.47
2:B:561:PHE:HD1	2:B:566:SER:HB2	1.80	0.47
2:F:487:SER:OG	2:F:680:HIS:NE2	2.46	0.47
2:F:525:VAL:HB	2:F:550:LYS:HD2	1.96	0.47
2:A:490:LEU:O	2:A:551:ARG:NH1	2.48	0.47
2:B:572:ASP:O	2:B:576:LYS:HG3	2.15	0.47
2:C:533:THR:HA	2:C:569:ILE:O	2.15	0.47
2:C:570:ARG:NH2	2:C:572:ASP:OD2	2.48	0.47
2:B:432:ASP:OD1	2:B:432:ASP:N	2.47	0.46
2:F:669:LEU:O	2:F:673:VAL:HG23	2.14	0.46
2:B:629:HIS:CE1	2:B:631:SER:HB3	2.51	0.46
2:B:561:PHE:CD1	2:B:566:SER:HB2	2.50	0.46
2:E:386:PRO:HG2	2:F:391:THR:HG23	1.97	0.46
2:D:464:ILE:HG12	2:D:655:LEU:HD21	1.97	0.46
2:F:513:LYS:NZ	2:F:603:ASP:OD1	2.49	0.46
2:E:349:VAL:HG13	2:E:367:LEU:HD22	1.98	0.45
2:F:522:ASP:O	2:F:550:LYS:NZ	2.27	0.45
2:D:614:ASP:O	2:D:618:MET:HG2	2.17	0.45
2:B:559:PRO:HD2	2:B:561:PHE:CZ	2.50	0.45
2:D:470:PRO:HD2	2:D:475:ASN:HD22	1.81	0.45
2:B:545:ALA:HB1	2:B:586:PRO:HG3	1.98	0.45
2:C:432:ASP:N	2:C:432:ASP:OD1	2.49	0.45
2:F:671:LEU:HD23	2:F:671:LEU:HA	1.82	0.45
2:A:520:ILE:HD11	2:A:524:PHE:HB2	1.97	0.45
2:C:458:MET:O	2:C:462:MET:HG2	2.17	0.45
2:F:498:LEU:HD13	2:F:574:ILE:HG23	1.97	0.45
2:F:527:THR:OG1	2:F:528:GLY:N	2.49	0.45
2:A:558:LEU:HB2	2:A:604:THR:HG22	1.99	0.45
2:C:607:LYS:NZ	2:C:692:GLU:O	2.33	0.45
2:F:574:ILE:HA	2:F:577:LEU:HB2	1.99	0.45
2:D:424:ASP:HB3	2:D:426:MET:HG2	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:504:GLU:HG3	2:C:505:THR:H	1.82	0.44
2:F:346:ASP:HB3	2:F:357:PHE:HE1	1.81	0.44
2:C:614:ASP:N	2:C:614:ASP:OD1	2.50	0.44
2:F:677:LYS:HB2	2:F:677:LYS:HE2	1.76	0.44
2:D:452:VAL:O	2:D:453:GLU:HB2	2.17	0.44
2:A:701:LYS:O	2:A:705:LEU:HB2	2.18	0.44
2:B:681:ILE:O	2:B:682:PRO:CB	2.66	0.44
2:F:517:LYS:O	2:F:517:LYS:HD2	2.18	0.44
2:F:412:LYS:HE3	2:F:436:TYR:CE1	2.53	0.43
2:F:666:PHE:HA	2:F:669:LEU:HB2	2.00	0.43
2:A:415:PHE:HZ	2:A:669:LEU:HD21	1.83	0.43
2:B:533:THR:HA	2:B:569:ILE:O	2.17	0.43
2:F:377:LYS:HB3	2:F:377:LYS:HE3	1.80	0.43
2:E:326:LEU:HD11	2:E:388:LYS:HG2	1.99	0.43
2:B:567:LYS:HB3	2:B:567:LYS:HE2	1.62	0.43
2:C:571:SER:OG	2:C:612:ARG:O	2.33	0.43
2:D:350:TRP:CZ2	2:D:353:ASN:HA	2.53	0.43
2:F:664:TYR:HB3	2:F:667:ALA:HB3	1.99	0.43
2:E:422:LEU:HD22	2:E:422:LEU:HA	1.86	0.43
2:B:519:ALA:HB2	2:B:668:PHE:HD2	1.84	0.43
2:F:457:GLU:HA	2:F:460:GLU:HG3	2.00	0.43
2:F:513:LYS:HG2	2:F:554:PHE:CE2	2.54	0.43
2:F:577:LEU:HD23	2:F:577:LEU:HA	1.86	0.43
2:E:417:ASN:N	2:E:417:ASN:OD1	2.52	0.43
2:B:385:CYS:SG	2:B:387:ARG:NH2	2.92	0.43
2:B:495:LYS:HB3	2:B:686:LEU:HD12	2.00	0.43
2:F:510:SER:HA	2:F:513:LYS:HB2	2.01	0.43
2:C:407:ASP:O	2:C:595:ARG:NH2	2.50	0.42
2:F:461:LEU:HB3	2:F:664:TYR:CE2	2.54	0.42
2:F:462:MET:O	2:F:466:ASN:HB2	2.19	0.42
2:D:571:SER:HB3	2:D:617:LEU:HD13	2.01	0.42
2:F:600:ILE:HG22	2:F:602:ILE:HD11	2.01	0.42
2:C:693:ILE:HG22	2:C:696:PHE:H	1.84	0.42
2:B:349:VAL:HG21	2:B:363:LEU:HB3	2.01	0.42
2:B:475:ASN:OD1	2:B:478:ASN:HB3	2.20	0.42
2:D:475:ASN:OD1	2:D:478:ASN:HB3	2.19	0.42
2:D:568:LYS:HD2	2:D:611:ASP:OD1	2.20	0.42
2:E:417:ASN:ND2	2:E:446:PHE:O	2.52	0.42
2:D:544:ILE:HA	2:D:547:MET:HG3	2.00	0.42
2:D:435:LYS:HE3	2:D:436:TYR:CZ	2.55	0.41
2:F:507:THR:HG22	2:F:509:LYS:HG2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:599:THR:O	2:F:599:THR:OG1	2.38	0.41
2:A:649:LYS:HG2	2:A:650:LEU:H	1.85	0.41
2:D:458:MET:HE3	2:D:461:LEU:HD23	2.02	0.41
2:C:358:ASN:HB3	2:C:361:GLU:O	2.20	0.41
2:E:411:ASP:O	2:E:412:LYS:NZ	2.38	0.41
2:D:477:LYS:HE3	2:D:477:LYS:HB3	1.75	0.41
2:D:586:PRO:HD2	2:D:589:SER:HB3	2.02	0.41
2:E:350:TRP:CD2	2:E:434:LYS:HG3	2.55	0.41
2:F:365:THR:HG23	2:F:389:ARG:HB3	2.02	0.41
2:C:386:PRO:HG2	2:D:391:THR:HG23	2.02	0.41
2:F:333:ILE:O	2:F:336:THR:OG1	2.37	0.41
2:F:362:PRO:O	2:F:366:LYS:HG3	2.21	0.41
2:F:530:THR:HA	2:F:533:THR:HG22	2.03	0.41
2:A:411:ASP:OD1	2:A:411:ASP:N	2.47	0.41
2:C:629:HIS:CE1	2:C:631:SER:HB2	2.56	0.41
2:F:450:LYS:HB2	2:F:450:LYS:HE2	1.79	0.41
2:A:563:CYS:HB2	2:B:612:ARG:HD3	2.02	0.40
2:B:435:LYS:HE2	2:B:435:LYS:HB3	1.66	0.40
2:D:340:LEU:HB2	2:D:348:ILE:HG13	2.02	0.40
2:F:453:GLU:HA	2:F:670:TYR:HE2	1.81	0.40
2:D:558:LEU:HD23	2:D:558:LEU:HA	1.96	0.40
2:C:495:LYS:HE3	2:C:599:THR:OG1	2.20	0.40
2:C:586:PRO:HD2	2:C:589:SER:HB3	2.03	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	
2	A	414/463 (89%)	410 (99%)	4 (1%)	0	100	100
2	B	370/463 (80%)	354 (96%)	12 (3%)	4 (1%)	14	31

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	C	377/463 (81%)	365 (97%)	10 (3%)	2 (0%)	29	52
2	D	347/463 (75%)	328 (94%)	17 (5%)	2 (1%)	25	47
2	E	121/463 (26%)	113 (93%)	7 (6%)	1 (1%)	19	40
2	F	298/463 (64%)	266 (89%)	27 (9%)	5 (2%)	9	20
All	All	1927/2778 (69%)	1836 (95%)	77 (4%)	14 (1%)	26	44

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	570	ARG
2	B	681	ILE
2	B	682	PRO
2	C	453	GLU
2	C	570	ARG
2	F	665	ARG
2	D	453	GLU
2	F	424	ASP
2	F	679	TYR
2	B	406	THR
2	E	361	GLU
2	F	455	SER
2	F	361	GLU
2	D	455	SER

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	
2	A	387/425 (91%)	375 (97%)	12 (3%)	40	67
2	B	336/425 (79%)	328 (98%)	8 (2%)	49	75
2	C	343/425 (81%)	337 (98%)	6 (2%)	60	82
2	D	319/425 (75%)	310 (97%)	9 (3%)	43	70
2	E	109/425 (26%)	102 (94%)	7 (6%)	17	36

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	F	255/425 (60%)	229 (90%)	26 (10%)	7 15
All	All	1749/2550 (69%)	1681 (96%)	68 (4%)	36 58

All (68) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	424	ASP
2	A	431	ASP
2	A	453	GLU
2	A	474	GLU
2	A	476	LYS
2	A	566	SER
2	A	585	ARG
2	A	595	ARG
2	A	603	ASP
2	A	614	ASP
2	A	656	ASP
2	A	750	ARG
2	B	334	LEU
2	B	346	ASP
2	B	426	MET
2	B	432	ASP
2	B	522	ASP
2	B	526	GLU
2	B	554	PHE
2	B	656	ASP
2	C	331	GLN
2	C	432	ASP
2	C	435	LYS
2	C	656	ASP
2	C	684	MET
2	C	695	ASP
2	D	382	GLU
2	D	424	ASP
2	D	431	ASP
2	D	447	ASP
2	D	474	GLU
2	D	537	ASP
2	D	554	PHE
2	D	572	ASP
2	D	625	ARG
2	E	325	LYS

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Mol	Chain	Res	Type
2	E	356	LYS
2	E	387	ARG
2	E	402	ASP
2	E	422	LEU
2	E	424	ASP
2	E	444	PHE
2	F	405	GLU
2	F	411	ASP
2	F	432	ASP
2	F	436	TYR
2	F	447	ASP
2	F	461	LEU
2	F	471	LEU
2	F	483	GLU
2	F	495	LYS
2	F	497	CYS
2	F	514	ARG
2	F	516	LEU
2	F	522	ASP
2	F	546	ASN
2	F	554	PHE
2	F	555	CYS
2	F	556	SER
2	F	571	SER
2	F	603	ASP
2	F	604	THR
2	F	623	VAL
2	F	663	ARG
2	F	665	ARG
2	F	669	LEU
2	F	671	LEU
2	F	679	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
2	D	529	GLN
2	F	475	ASN

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](#)

Of 6 ligands modelled in this entry, 3 are monoatomic - leaving 3 for Mogul analysis.

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
3	ANP	C	801	4	29,33,33	1.05	4 (13%)	31,52,52	1.09	2 (6%)
3	ANP	B	801	4	29,33,33	1.06	4 (13%)	31,52,52	1.05	2 (6%)
3	ANP	A	801	4	29,33,33	1.07	4 (13%)	31,52,52	1.06	2 (6%)

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
3	ANP	C	801	4	-	2/14/38/38	0/3/3/3
3	ANP	B	801	4	-	5/14/38/38	0/3/3/3
3	ANP	A	801	4	-	3/14/38/38	0/3/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	801	ANP	PG-N3B	2.51	1.69	1.63
3	C	801	ANP	PG-N3B	2.48	1.69	1.63
3	A	801	ANP	PG-N3B	2.46	1.69	1.63
3	A	801	ANP	PG-O1G	2.34	1.49	1.46
3	B	801	ANP	PG-O1G	2.28	1.49	1.46
3	C	801	ANP	PG-O1G	2.27	1.49	1.46
3	A	801	ANP	PB-O3A	-2.24	1.56	1.59
3	B	801	ANP	PB-O3A	-2.20	1.56	1.59
3	C	801	ANP	PB-O3A	-2.17	1.56	1.59
3	A	801	ANP	PB-O1B	2.16	1.49	1.46
3	C	801	ANP	PB-O1B	2.14	1.49	1.46
3	B	801	ANP	PB-O1B	2.11	1.49	1.46

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	801	ANP	PB-O3A-PA	-3.33	120.88	132.62
3	A	801	ANP	PB-O3A-PA	-3.19	121.38	132.62
3	B	801	ANP	PB-O3A-PA	-3.18	121.42	132.62
3	A	801	ANP	C5-C6-N6	2.30	123.84	120.35
3	B	801	ANP	C5-C6-N6	2.28	123.81	120.35
3	C	801	ANP	C5-C6-N6	2.27	123.80	120.35

There are no chirality outliers.

All (10) torsion outliers are listed below:

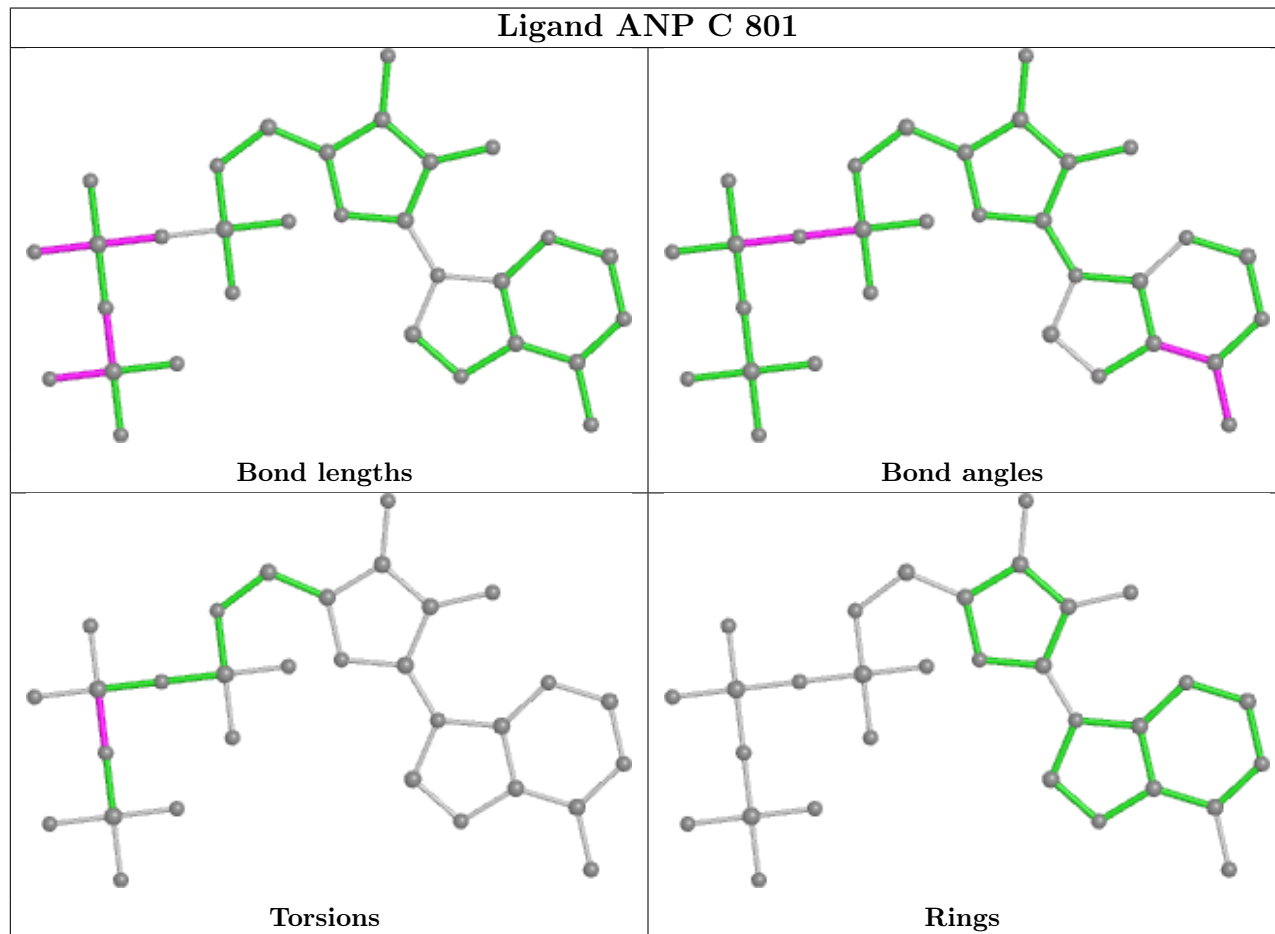
Mol	Chain	Res	Type	Atoms
3	A	801	ANP	PG-N3B-PB-O1B
3	A	801	ANP	PG-N3B-PB-O3A
3	B	801	ANP	PB-N3B-PG-O1G
3	B	801	ANP	PG-N3B-PB-O1B
3	B	801	ANP	PG-N3B-PB-O3A
3	C	801	ANP	PG-N3B-PB-O1B
3	C	801	ANP	PG-N3B-PB-O3A
3	B	801	ANP	C5'-O5'-PA-O3A
3	B	801	ANP	C5'-O5'-PA-O2A
3	A	801	ANP	C5'-O5'-PA-O3A

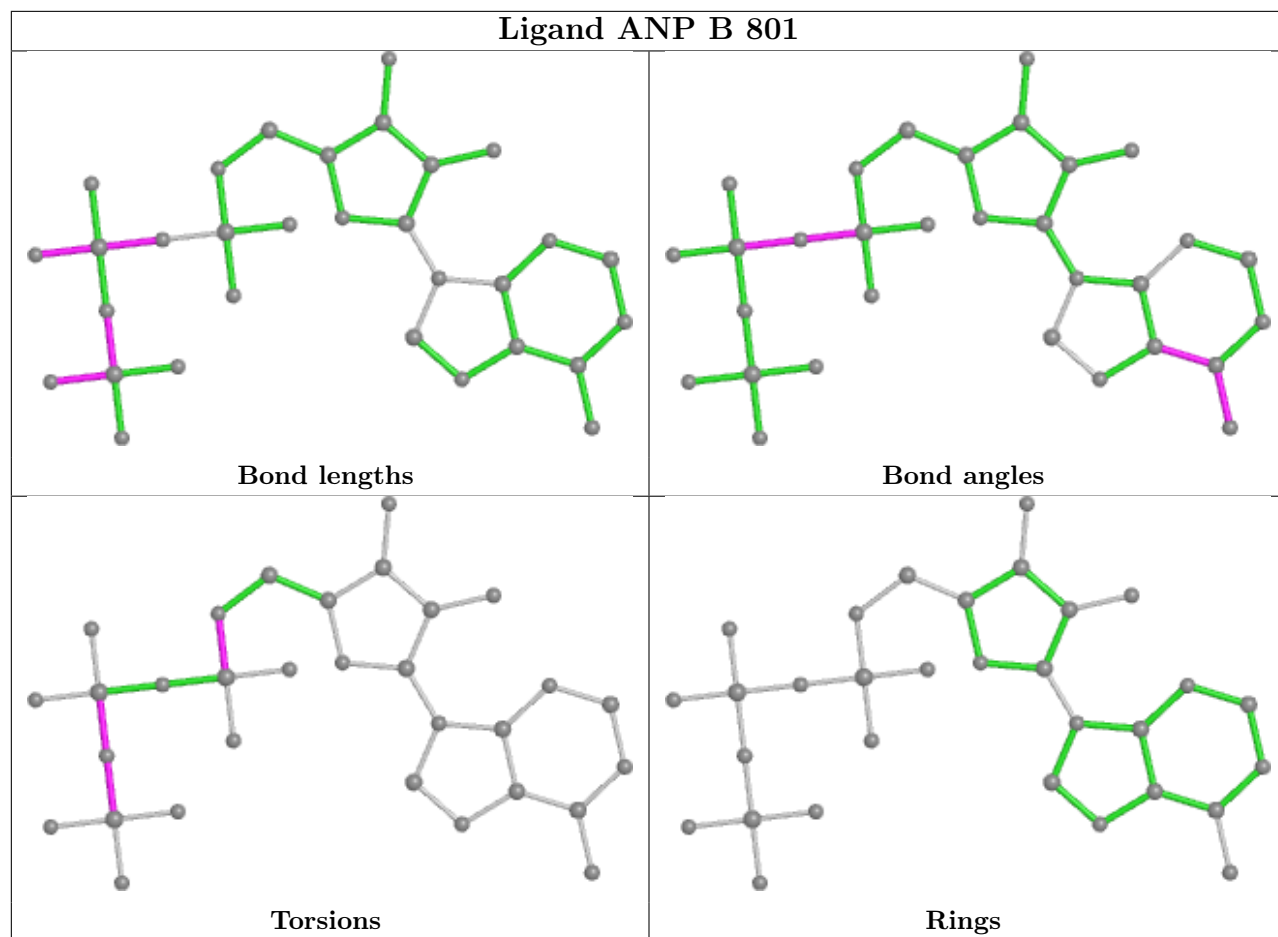
There are no ring outliers.

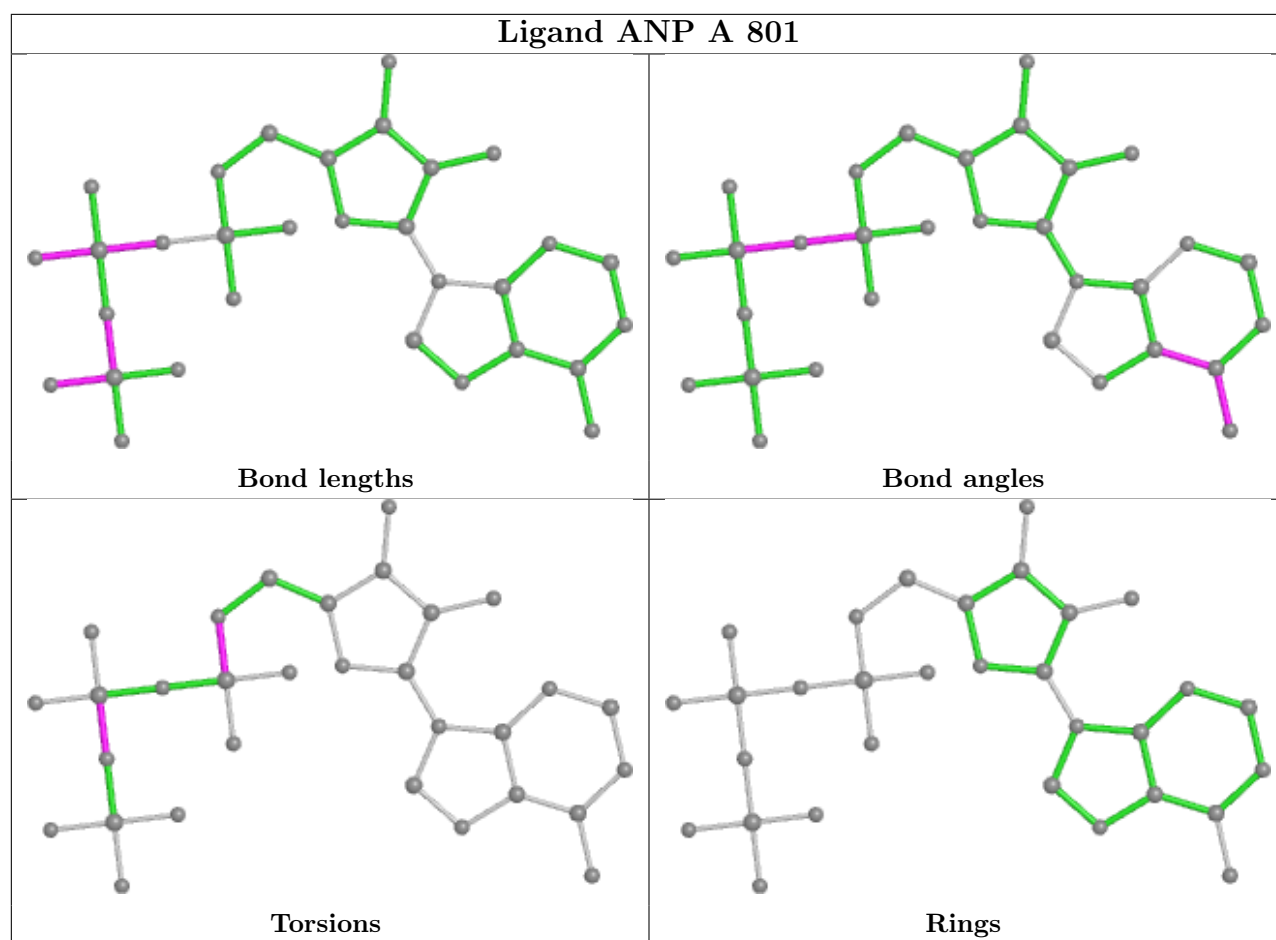
No monomer is involved in short contacts.

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.

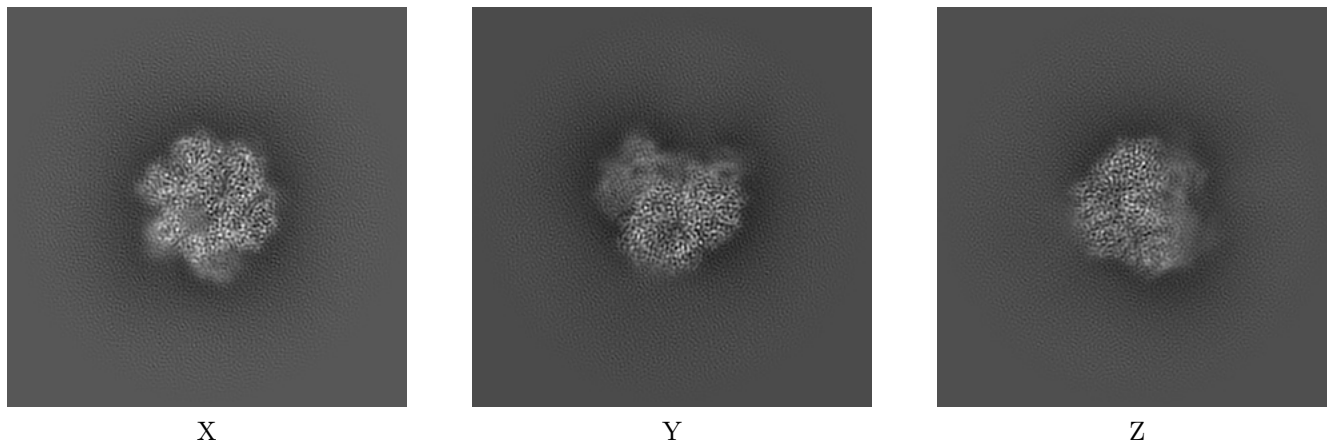
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-38396. These allow visual inspection of the internal detail of the map and identification of artifacts.

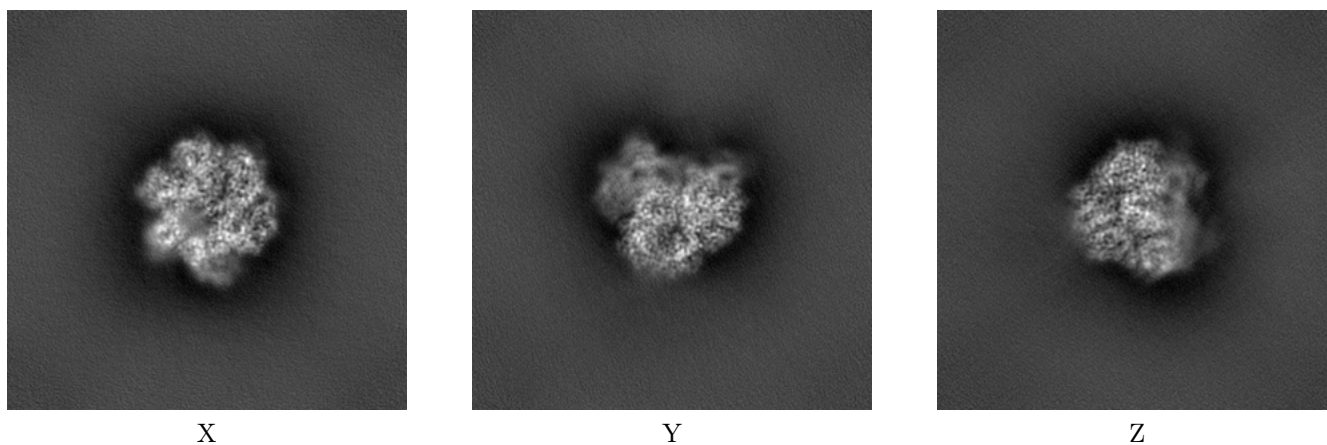
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

6.1.1 Primary map



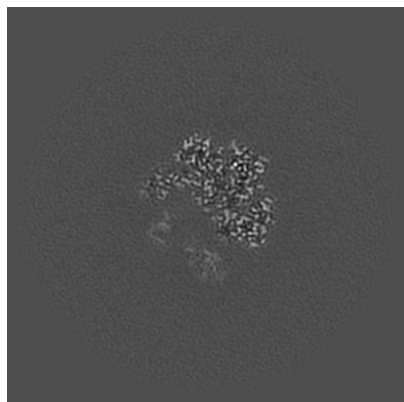
6.1.2 Raw map



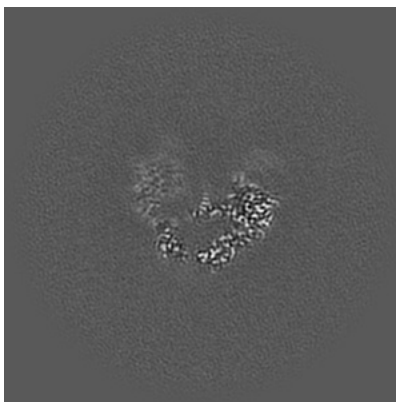
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

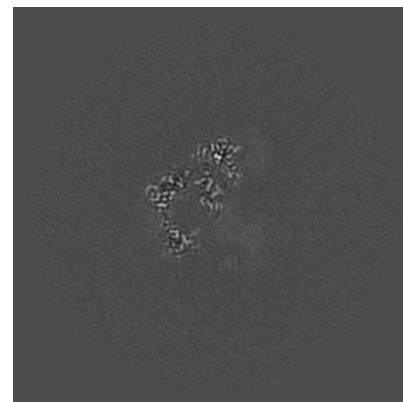
6.2.1 Primary map



X Index: 140

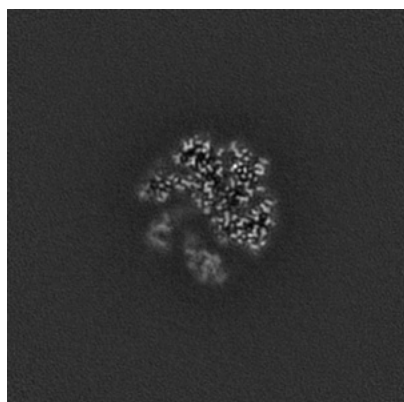


Y Index: 140



Z Index: 140

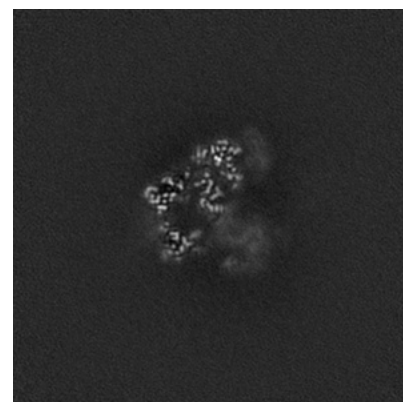
6.2.2 Raw map



X Index: 140



Y Index: 140

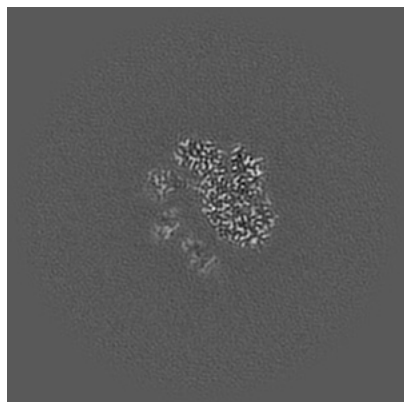


Z Index: 140

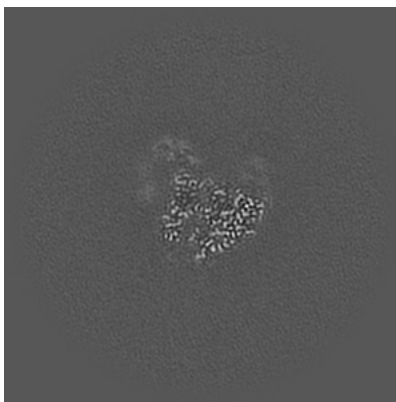
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

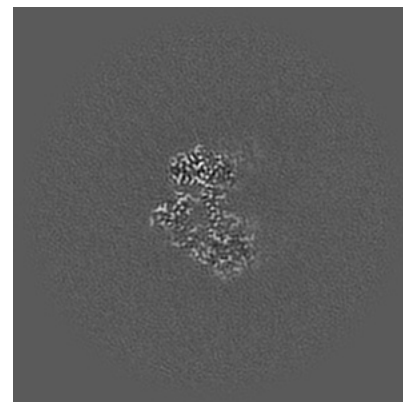
6.3.1 Primary map



X Index: 136

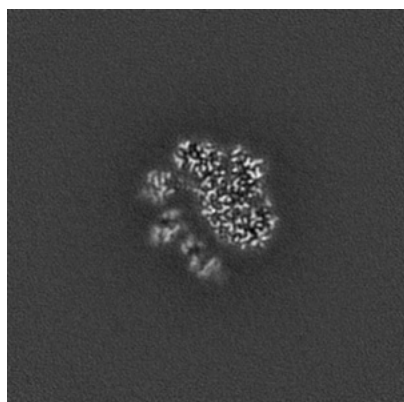


Y Index: 160

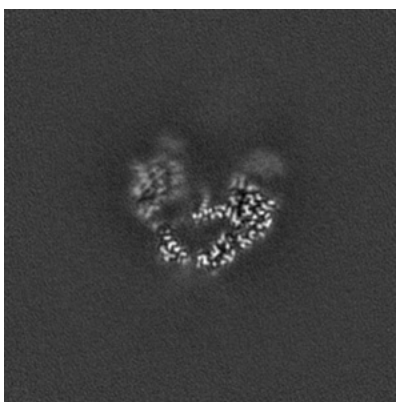


Z Index: 155

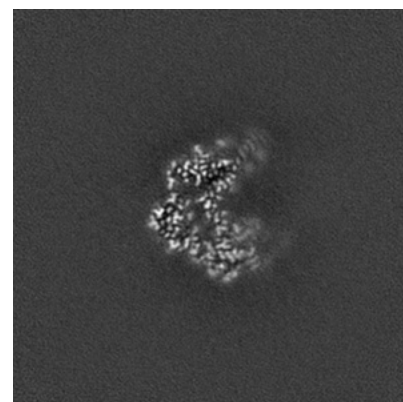
6.3.2 Raw map



X Index: 136



Y Index: 141

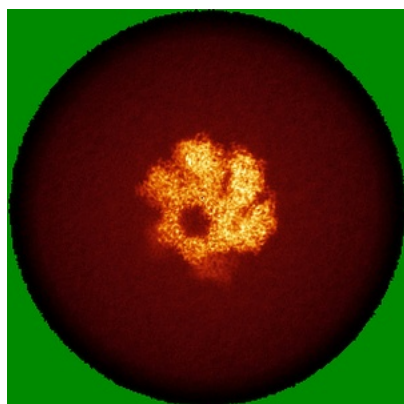


Z Index: 151

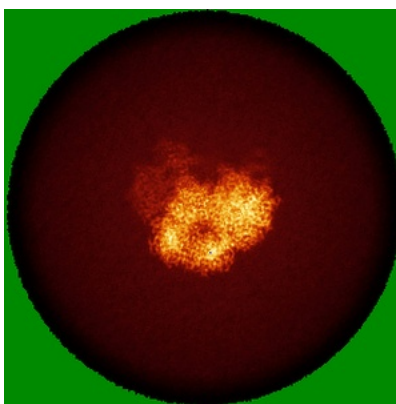
The images above show the largest variance slices of the map in three orthogonal directions.

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

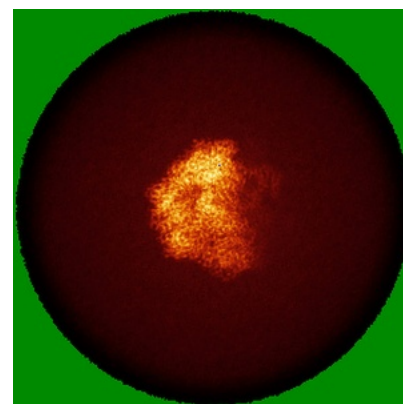
6.4.1 Primary map



X

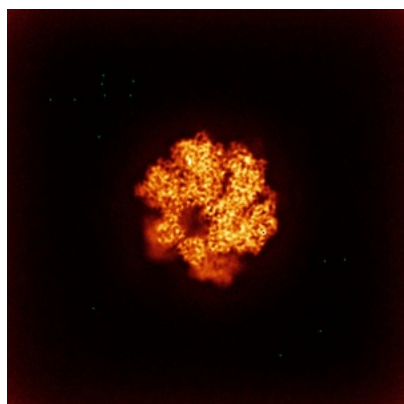


Y

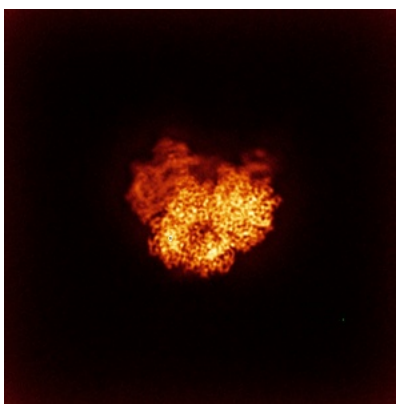


Z

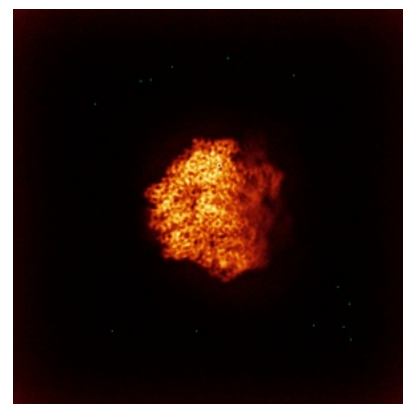
6.4.2 Raw map



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



X



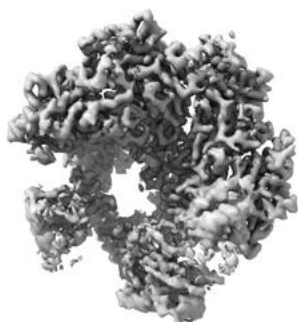
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.733. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

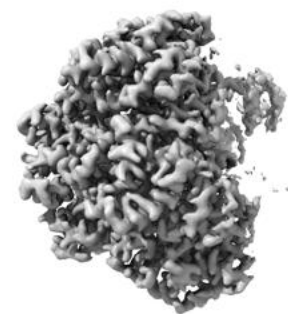
6.5.2 Raw map



X



Y



Z

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.

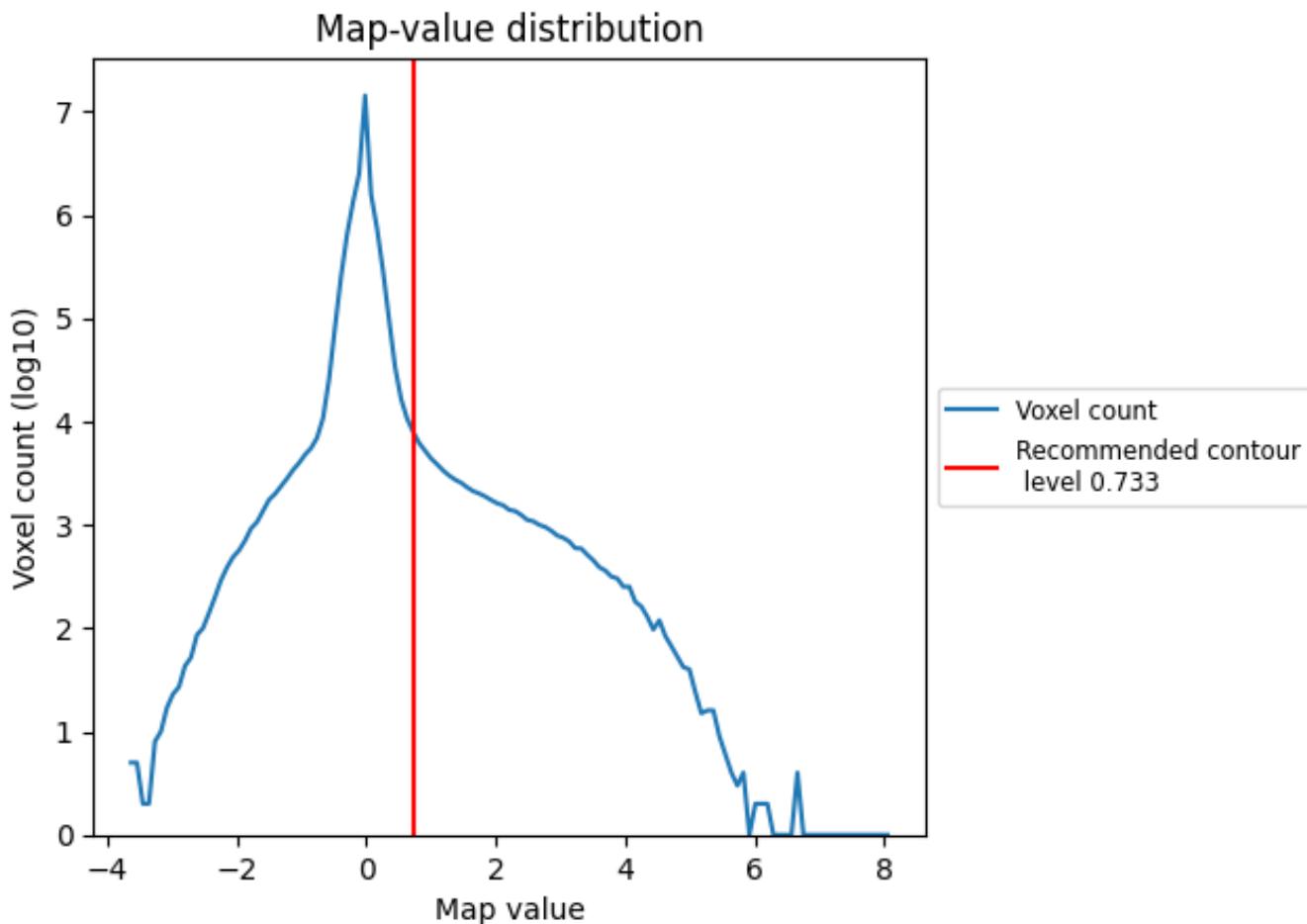
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

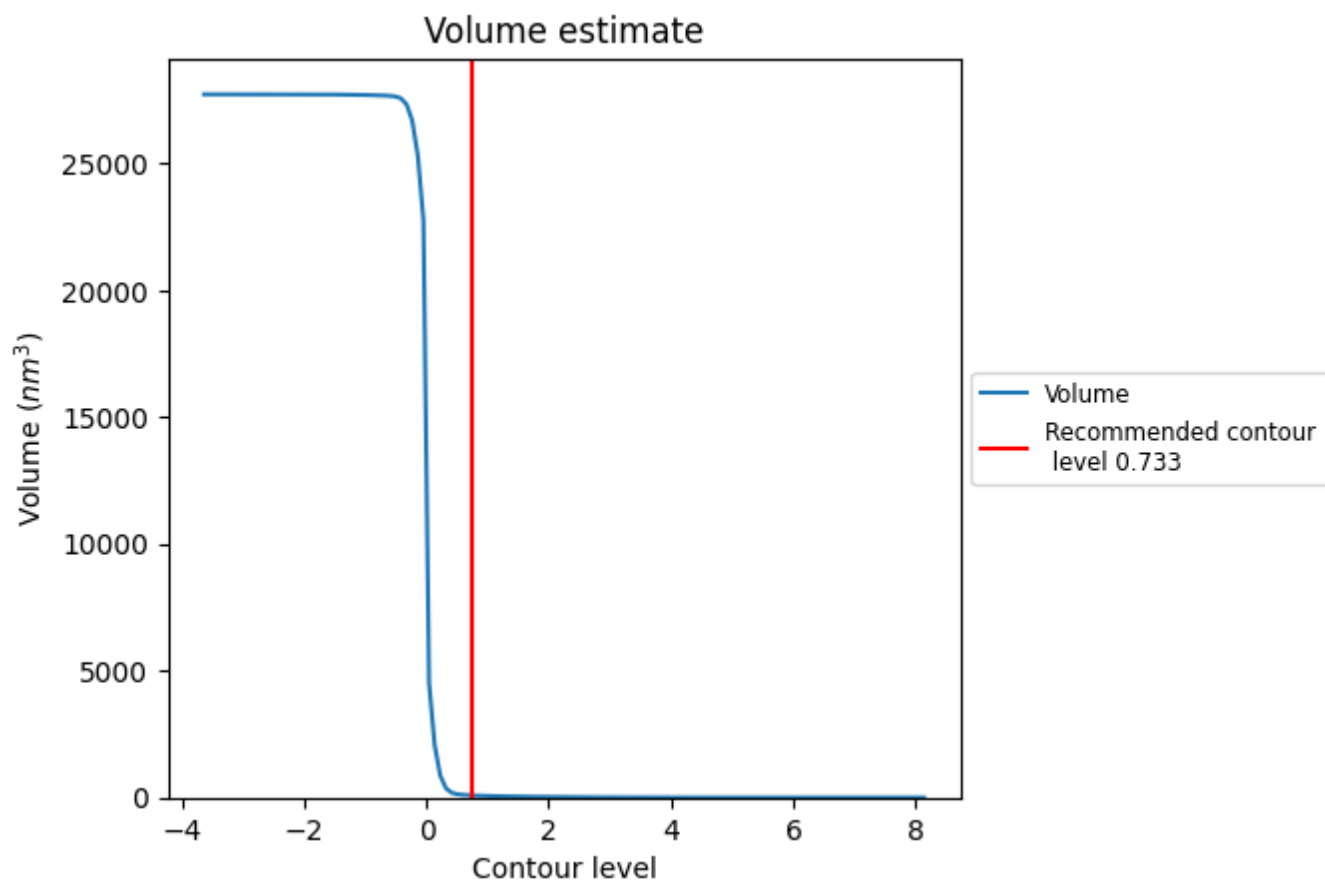
This section contains the results of statistical analysis of the map.

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.

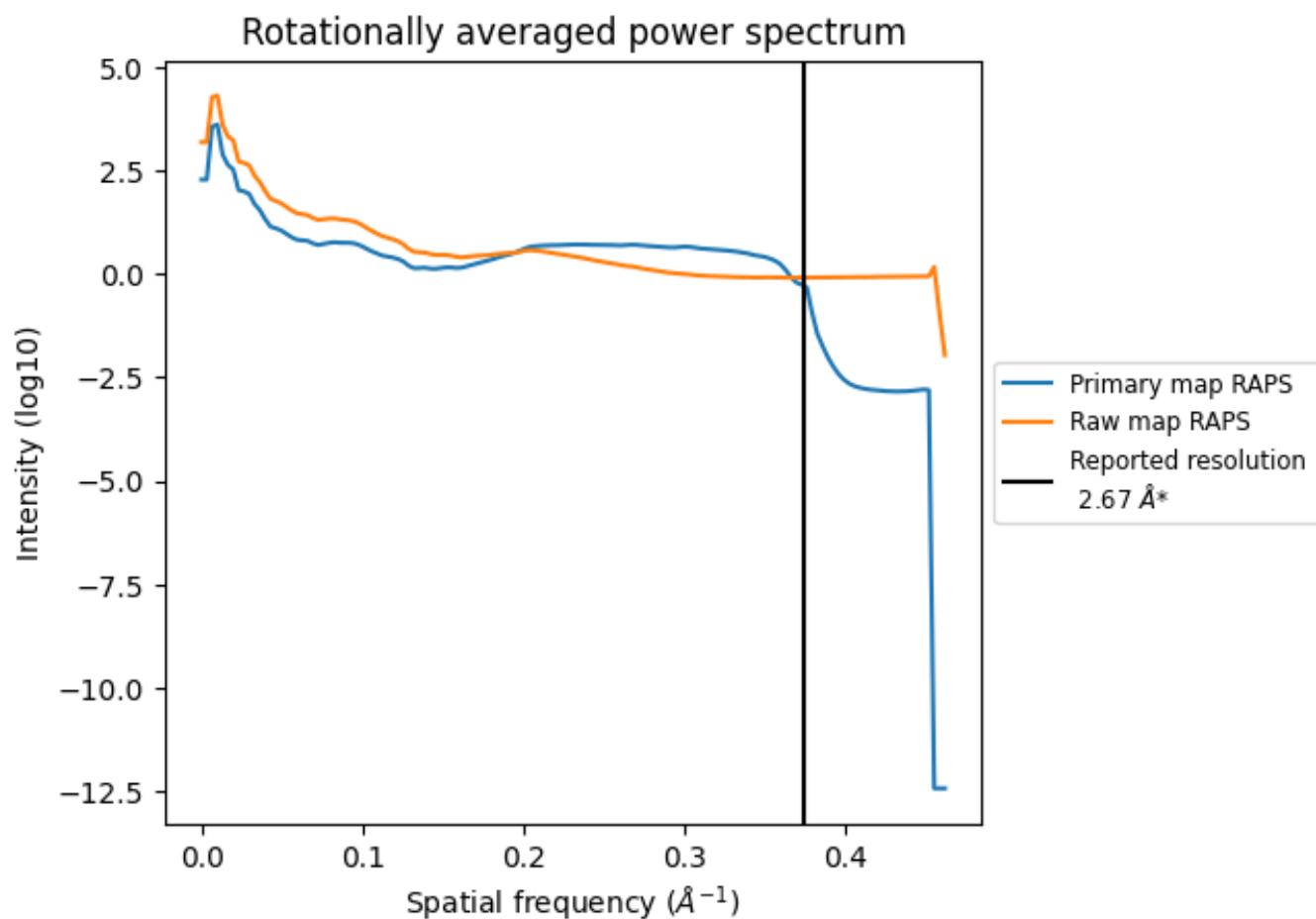
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 86 nm^3 ; this corresponds to an approximate mass of 78 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](#)

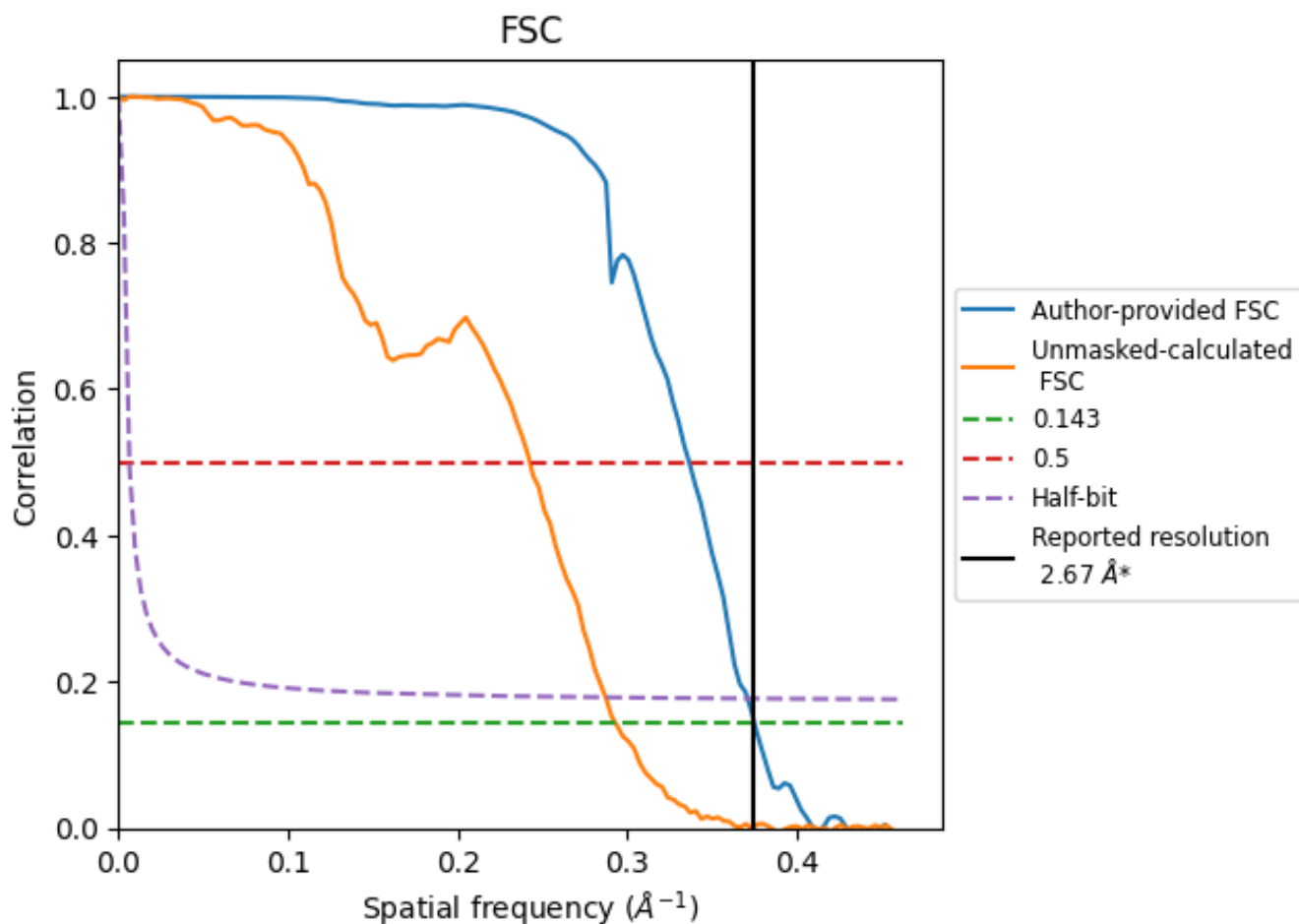


*Reported resolution corresponds to spatial frequency of 0.375 Å⁻¹

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 0.375 Å⁻¹

8.2 Resolution estimates [i](#)

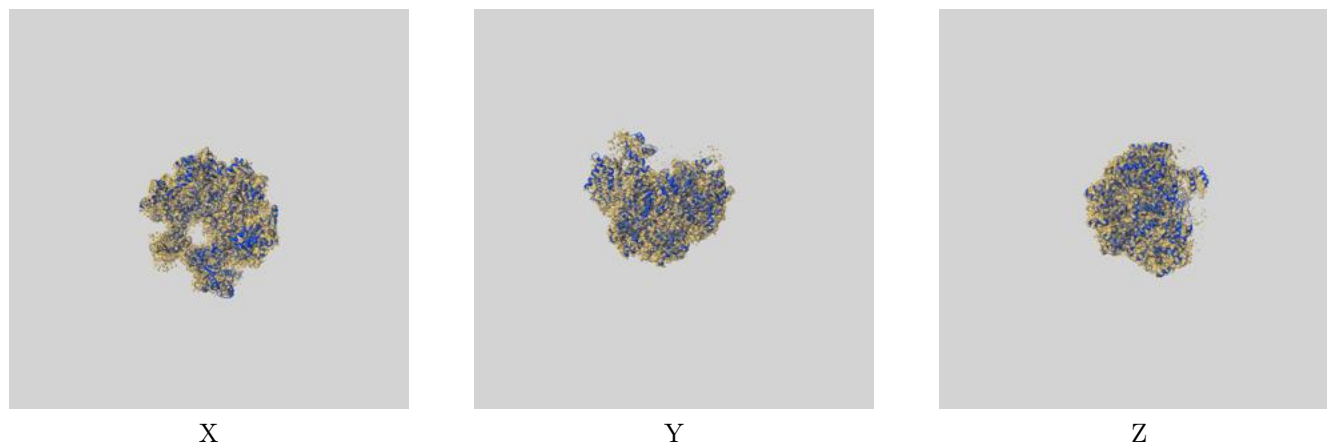
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.67	-	-
Author-provided FSC curve	2.67	2.97	2.70
Unmasked-calculated*	3.41	4.13	3.48

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.41 differs from the reported value 2.67 by more than 10 %

9 Map-model fit [i](#)

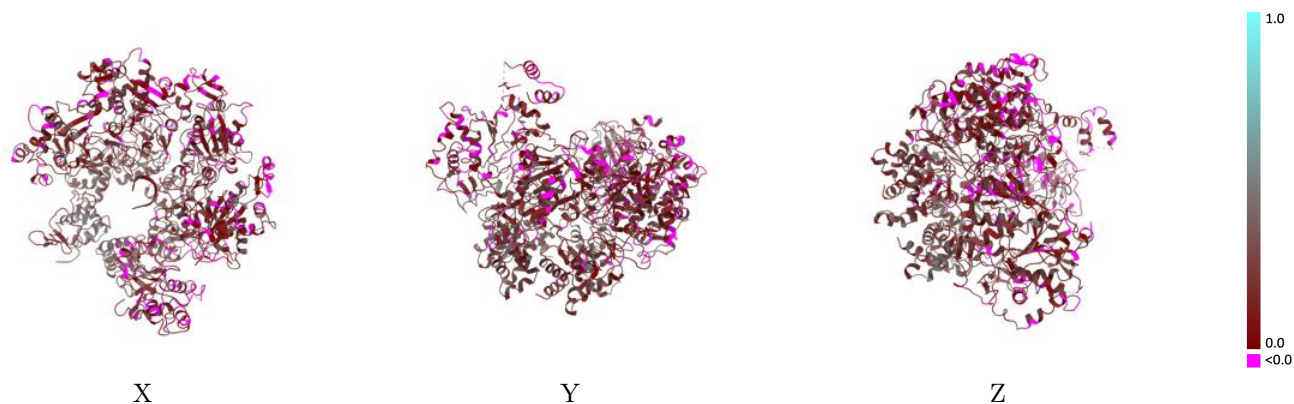
This section contains information regarding the fit between EMD map EMD-38396 and PDB model 8XJ8. Per-residue inclusion information can be found in section 3 on page 5.

9.1 Map-model overlay [i](#)



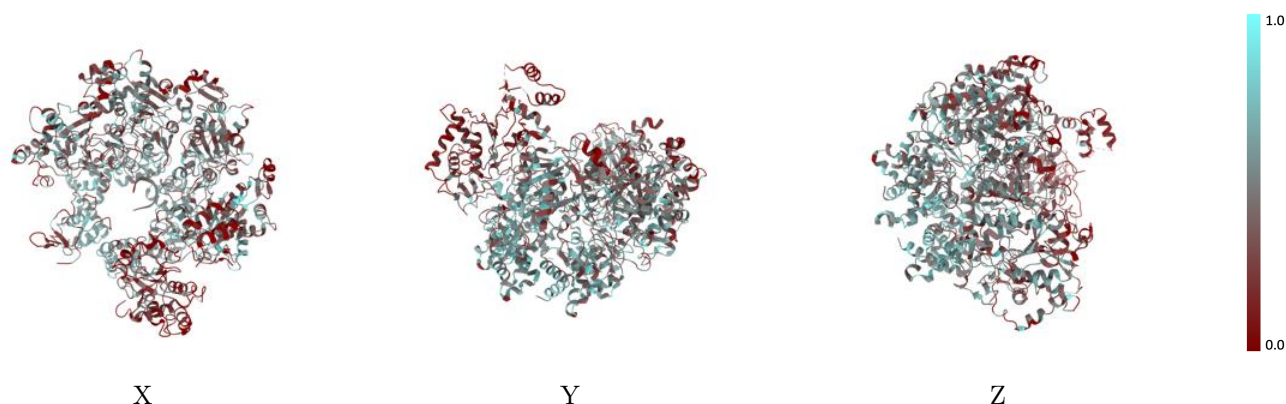
The images above show the 3D surface view of the map at the recommended contour level 0.733 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



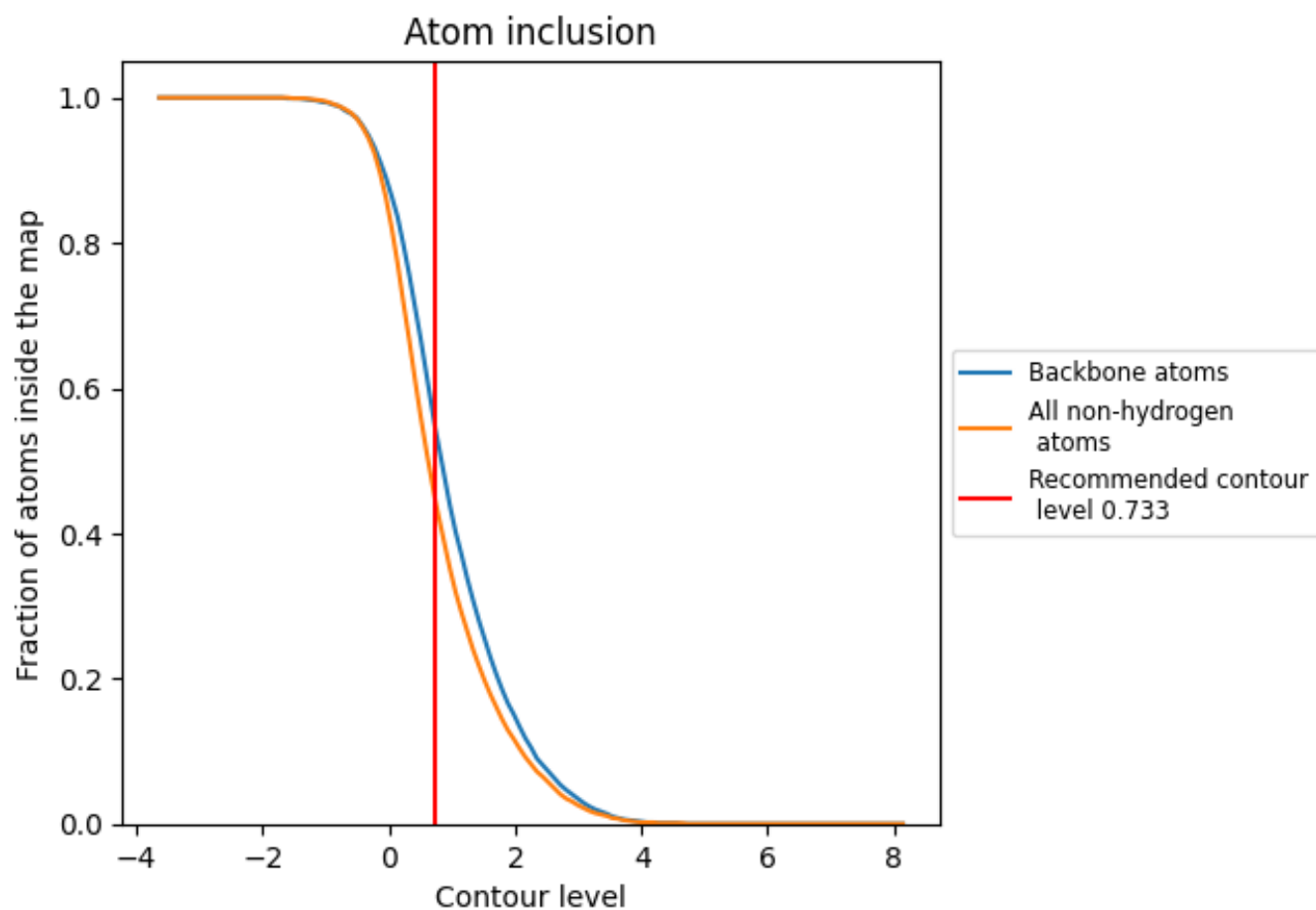
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.733).

9.4 Atom inclusion [i](#)



At the recommended contour level, 54% of all backbone atoms, 44% 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 (0.733) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4450	0.1890
A	0.4650	0.1800
B	0.4750	0.1620
C	0.4830	0.1770
D	0.4550	0.2030
E	0.4680	0.3140
F	0.3110	0.1890
X	0.3920	0.1190

