W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report ⓘ

Mar 2, 2024 – 06:58 pm GMT

PDB ID	:	8CED
EMDB ID	:	EMD-16606
Title	:	Rnase R bound to a 30S degradation intermediate (State I - head-turning)
Authors	:	Paternoga, H.; Dimitrova-Paternoga, L.; Wilson, D.N.
Deposited on	:	2023-02-01
Resolution	:	4.15 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

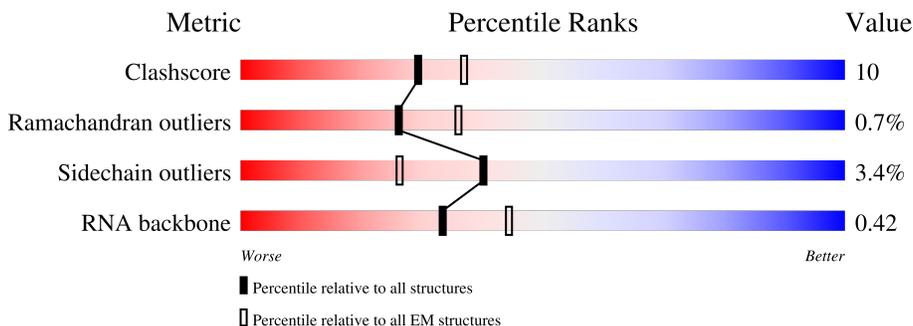|		
EMDB validation analysis	:	0.0.1.dev70
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	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 4.15 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	Percentile Ranks	Value
Clashscore		10
Ramachandran outliers		0.7%
Sidechain outliers		3.4%
RNA backbone		0.42

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
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 >=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 <=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	1554	34% / 28% 41% 16% • 14%
2	B	7	100% / 14% 29% 29% 29%
3	C	779	91% / 85% 5% 9%
4	D	246	79% / 77% 10% •• 11%
5	F	200	45% / 64% 26% • 8%
6	G	166	30% / 65% 28% • 5%
7	I	132	30% / 69% 26% • ••

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Mol	Chain	Length	Quality of chain
8	L	138	33% 86% 11%
9	O	89	25% 65% 27%
10	P	90	20% 72% 24%
11	Q	87	29% 72% 20%
12	S	88	38% 68% 23% 6%
13	T	95	79% 86% 12%
14	U	79	65% 62% 18% 19%
15	V	131	77% 73% 5% 23%
16	E	218	93% 82% 12% 6%
17	H	156	95% 83% 12%
18	J	130	80% 72% 11% 17%
19	K	102	93% 82% 9% 7%
20	M	121	89% 81% 8% 11%
21	N	61	80% 67% 11% 20%
22	R	92	85% 66% 17% 15%

2   Entry composition ⓘ

There are 22 unique types of molecules in this entry. The entry contains 51964 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 RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1333	Total 28597	C 12753	N 5245	O 9266	P 1333	0	0

- Molecule 2 is a RNA chain called RNA Substrate.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	7	Total 154	C 70	N 35	O 42	P 7	0	0

- Molecule 3 is a protein called RNase R.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	708	Total 5650	C 3559	N 962	O 1102	S 27	0	0

- Molecule 4 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	218	Total 1757	C 1119	N 309	O 323	S 6	0	0

- Molecule 5 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	185	Total 1490	C 942	N 276	O 270	S 2	0	0

- Molecule 6 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	G	158	Total 1170	C 736	N 216	O 216	S 2	0	0

- Molecule 7 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	I	131	Total	C	N	O	S	0	0
			1036	655	191	187	3		

- Molecule 8 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	L	136	Total	C	N	O	S	0	0
			1052	653	211	186	2		

- Molecule 9 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	O	85	Total	C	N	O	S	0	0
			710	436	144	129	1		

- Molecule 10 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	P	88	Total	C	N	O	S	0	0
			695	441	128	124	2		

- Molecule 11 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	Q	84	Total	C	N	O	S	0	0
			691	435	128	126	2		

- Molecule 12 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	S	83	Total	C	N	O	S	0	0
			637	390	130	116	1		

- Molecule 13 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	T	95	Total	C	N	O	S	0	0
			784	492	138	152	2		

- Molecule 14 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	U	64	Total 518	C 332	N 96	O 88	S 2	0	0

- Molecule 15 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	V	101	Total 730	C 450	N 136	O 143	S 1	0	0

- Molecule 16 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	E	205	Total 1615	C 1009	N 303	O 300	S 3	0	0

- Molecule 17 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	H	149	Total 1181	C 740	N 220	O 215	S 6	0	0

- Molecule 18 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	J	108	Total 826	C 510	N 160	O 155	S 1	0	0

- Molecule 19 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	K	95	Total 761	C 479	N 139	O 141	S 2	0	0

- Molecule 20 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms				AltConf	Trace
20	M	108	Total 868	C 534	N 176	O 158	0	0

- Molecule 21 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	N	49	Total 409	C 263	N 79	O 63	S 4	0	0

- Molecule 22 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	R	78	Total 633	C 409	N 112	O 110	S 2	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

● Molecule 2: RNA Substrate

Chain B:

100%

14%   29%   29%   29%

A9002 A9003 A9004 A9005 A9006 A9007 A9008

- Molecule 3: RNase R

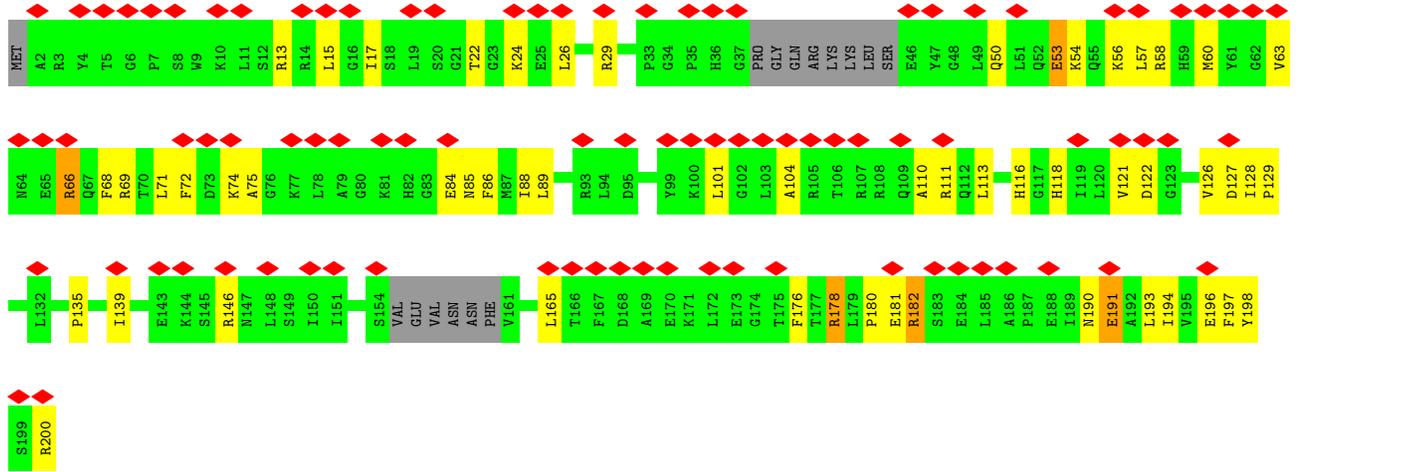Chain C:

91%

85%   5%   9%

MET GLU K3 E4 A5 F6 M7 E8 K9 L10 L11 S12 F13 M14 K15 E16 E17 A18 Y19 K20 P21 L22 T23 V24 Q25 E26 L27 E28 E29 M30 L31 N32 I33 T34 E35 A36 E37 E38 F39 K40 E41 L42 V43 K44 A45 L46 V47 A48 L49 E50 E51 K52 G53 L54 I55 V56 R57 T58 R59 S60

D61 R62 Y63 G64 I65 P66 E67 K68 M69 N70 L71 I72 K73 G74 K75 I76 S77 A78 H79 A80 K81 G82 F83 A84 F85 L86 L87 P88 E89 D90 T91 S92 L93 S94 D95 V96 F97 I98 P99 P100 N101 E102 L103 N104 T105 A106 M107 N108 G109 D110 I111 V112 M113 V114 R115 L116 N117 S118 Q119 S120

S121 G122 S123 R124 Q125 E126 G127 T128 V129 I130 R131 I132 L133 E134 R135 A136 I137 Q138 R139 V140 V141 G142 T143 Y144 T145 T146 T147 R148 N149 F150 G151 F152 V153 I154 P155 D156 D157 K158 K159 I160 T161 S162 D163 I164 F165 I166 P167 K168 N169 G170 K171 N172 G173 A174 A175 E176 G177 H178 K179 V180

V181 V182 K183 L184 T185 S186 Y187 P188 E189 G190 R191 M192 N193 A194 E195 G196 E197 V198 E199 T200 I201 L202 G203 H204 K205 N206 D207 P208 G209 I210 D211 I212 L213 S214 V215 I216 H217 K218 H219 G220 L221 P222 G223 E224 F225 P226 A227 D228 A229 M230 E231 Q232 A233 S234 S235 T236 P237 D238 T239 I240

D241 E242 K243 D244 L245 K246 D247 R248 R249 D250 L251 R252 D253 Q254 V255 I256 V257 T258 I259 D260 G261 A262 D263 A264 K265 D266 L267 D268 D269 A270 V271 T272 V273 T274 K275 L276 D277 D278 G279 S280 Y281 K282 L283 G284 V285 H286 I287 A288 D289 V290 S291 H292 Y293 V294 T295 E296 N297 S298 P299 I300

D301 K302 E303 A304 L305 E306 R307 G308 T309 S310 V311 Y312 L313 V314 D315 R316 V317 I318 P319 M320 I321 P322 H323 R324 L325 S326 N327 G328 I329 C330 S331 L332 N333 P334 K335 V336 D337 R338 L339 T340 L341 S342 C343 E344 M345 T346 I347 N348 S349 Q350 G351 Q352 V353 T354 E355 H356 E357 I358 F359 Q360

S361 V362 I363 K364 T365 T366 E367 R368 M369 T370 Y371 S372 D373 V374 N375 K376 I377 L378 V379 D380 D381 D382 E383 E384 L385 K386 Q387 Y389 E390 P391 L392 V393 P394 M395 F396 K397 D398 M399 R400 R401 L402 A403 Q404 I405 L406 D407 D408 K409 R410 M411 D412 R413 G414 A415 V416 D417 F418 D419 F420

K421 E422 A423 K424 V425 L426 V427 D428 D429 E430 G431 A432 V433 K434 D435 V436 V437 I438 R439 E440 R441 S442 V443 A444 E445 K446 L447 I448 E449 E450 F451 M452 L453 V454 A455 N456 E457 T458 V459 A460 E461 H462 F463 H464 W465 M466 N467 V468 P469 F470 I471 Y472 R473 I474 H475 E476 E477 P478 N479 A480

E481 K482 L483 Q484 K485 F486 L487 E488 F489 V490 T491 T492 F493 G494 Y495 V496 V497 K498 G499 G500 A501 G502 N503 I504 H505 P506 A507 A508 L509 Q510 Q511 S512 I513 D514 A515 V516 R517 D518 R519 P520 E521 E522 T523 V524 I525 S526 T527 V528 M529 L530 R531 S532 M533 K534 Q535 A536 K537 Y538 D539 P540

Q541 S542 L543 G544 H545 F546 G547 L548 S549 T550 E551 F552 Y553 T554 H555 F556 T557 S558 P559 I560 R561 R562 Y563 P564 D565 L566 I567 V568 H569 R570 L571 I572 R573 T574 V575 L576 I577 N578 G579 K580 V581 D582 E583 A584 T585 Q586 E587 K588 W589 A590 E591 R592 L593 P594 D595 I596 A597 E598 H599 T600

S601 S602 M603 E604 R605 R606 A607 V608 D609 A610 E611 R612 E613 T614 D615 D616 L617 K618 K619 A620 E621 Y622 M623 L624 D625 K626 I627 G628 E629 E630 F631 D632 G633 M634 I635 S636 S637 V638 T639 N640 F641 G642 M643 F644 V645 E646 L647 P648 N649 T650 I651 E652 G653 L654 V655 H656 V657 S658 F659 M660

T661 D662 D663 Y664 Y665 R666 F667 D668 E669 Q670 H671 F672 A673 M674 I675 G676 E677 R678 T679 G680 N681 V682 F683 R684 I685 G686 D687 E688 I689 T690 V691 K692 V693 V694 D695 V696 N697 K698 D699 E700 R701 N702 I703 D704 F705 E706 I707 V708 G709 M710 LYS GLY THR PRO ARG ARG PRO ARG GLU LEU

ASP SER SER ARG SER ARG LYS ARG GLY LYS PRO ALA ARG LYS ARG VAL GLN SER THR ASN THR PRO VAL SER PRO ALA PRO SER GLU GLU LYS GLY LYS GLU TRP PHE THR LYS PRO LYS LYS LYS LYS LYS LYS ARG GLY PHE GLN ASN ALA PRO LYS GLN LYS ARG LYS LYS LYS LYS

• Molecule 4: 30S ribosomal protein S2

Chain D:

79%
77%   10%   ••   11%

MET SER VAL ILE SER MET LYS GLN L9 L10 E11 A12 G13 V14 H15 F16 G17 H18 Q19 T20 R21 R22 W23 N24 P25 K26 M27 K28 R29 Y30 I31 F32 T33 E34 R35 N36 G37 I38 Y39 I40 I41 D42 L43 Q44 K45 T46 V47 K48 K49 V50 E51 E52 A53 Y54 N55 F56 T57 K58 N59 L60

A61 A62 E63 G64 G65 K66 I67 L68 F69 V70 G71 T72 K73 K74 Q75 A76 Q77 D78 S79 V80 K81 E82 E83 R86 S87 G88 M89 Y90 Y91 V92 N93 Q94 R95 W96 L97 G98 G99 T100 L101 T102 N103 F104 E105 T106 I107 Q108 K109 R10 I111 K112 R113 L114 K115 D116 I117 E118 K119 M120 Q121

E122 N123 G124 T125 F126 D127 V128 L129 P130 K131 K132 E133 V134 V135 Q136 L137 K138 V139 E140 L141 E142 R143 L144 E145 K146 F147 L148 G149 G150 I151 K152 D153 M154 K155 D156 L157 P158 D159 A160 L161 F162 I163 I164 D165 P166 R167 K168 E169 R170 I171 A172 V173 A174 E175 A176 K177 K178 L179 P182

I183 I184 G185 I186 V187 D188 T189 N190 C191 D192 P193 D194 E195 I196 D197 V198 V199 I200 P201 A202 N203 D204 D205 A206 I207 R208 A209 V210 K211 L212 L213 T214 S215 K216 M217 A218 D219 A220 I221 L222 E223 A224 K225 Q226 GLY GLU GLU GLU ALA GLU VAL ALA GLU GLU THR ALA PRO GLU THR GLU

THR THR THR ALA

• Molecule 5: 30S ribosomal protein S4

Chain F:

45%
64%   26%   •   8%

MET A2 R3 Y4 T5 G6 P7 S8 W9 K10 L11 S12 R13 R14 L15 G16 I17 S18 L19 S20 G21 T22 G23 K24 E25 L26 R29 P33 G34 P35 H36 G37 PRO GLY GLN ARG LYS LYS LEU SER E46 Y47 G48 L49 Q50 L51 Q52 E53 K54 Q55 K56 L57 R58 H59 M60 Y61 G62 V63

N64 E65 R66 Q67 F68 R69 T70 L71 F72 D73 K74 A75 G76 K77 L78 A79 G80 K81 H82 G83 E84 N85 F86 M87 I88 L89 R93 L94 D95 Y99 K100 L101 G102 L103 A104 R105 T106 R107 R108 Q109 A110 R111 Q112 L113 H116 G117 H118 I119 L120 V121 D122 G123 V126 D127 I128 P129

L132 P135 I139 E143 K144 S145 R146 N147 L148 S149 I150 I151 S154 VAL GLU VAL ASN ASN PHE V161 L165 T166 F167 D168 A169 E170 K171 L172 E173 G174 T175 F176 T177 R178 L179 P180 E181 R182 S183 E184 L185 A186 P187 E188 I189 N190 E191 A192 L193 I194 V195 E196 F197 Y198

S199 R200

• Molecule 6: 30S ribosomal protein S5

Chain G:

30%
65%   28%   •   5%

• Molecule 7: 30S ribosomal protein S8

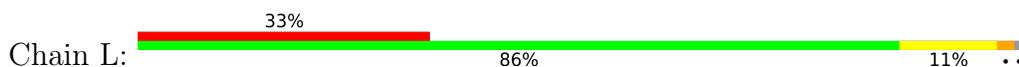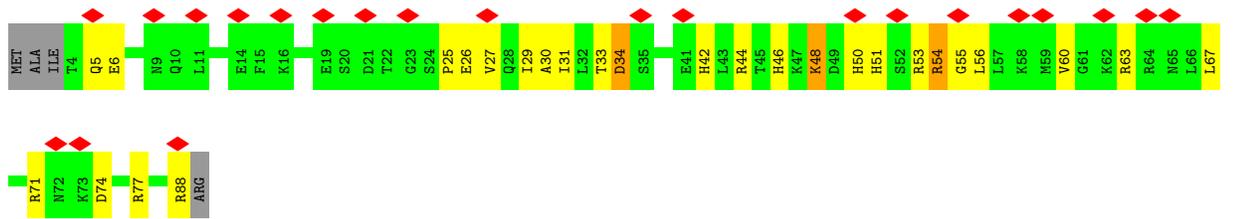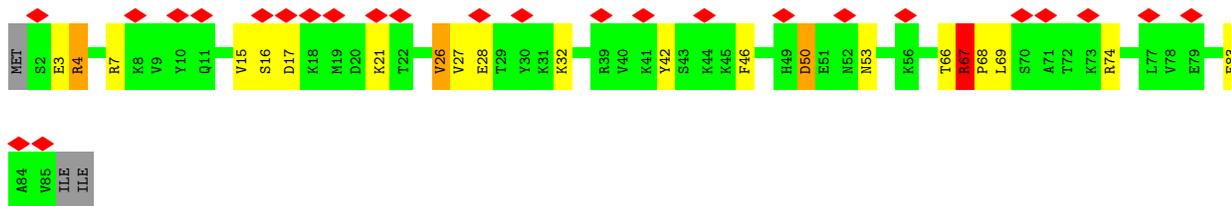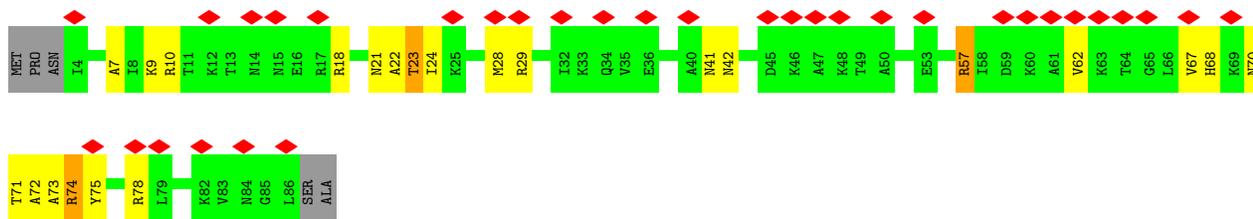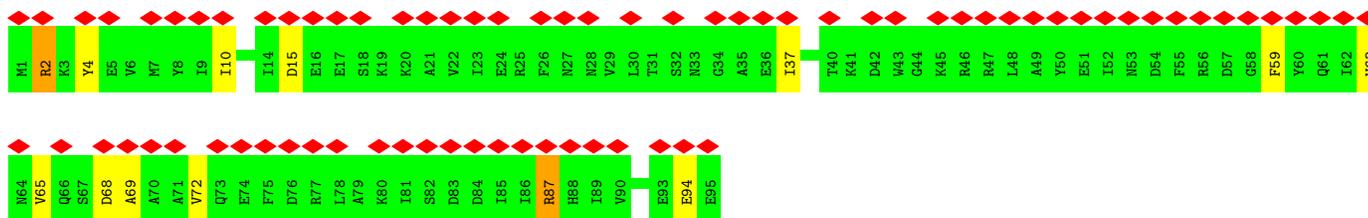Chain I:

• Molecule 8: 30S ribosomal protein S12

Chain L:

• Molecule 9: 30S ribosomal protein S15

Chain O:
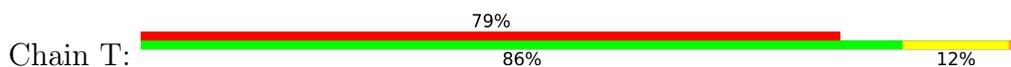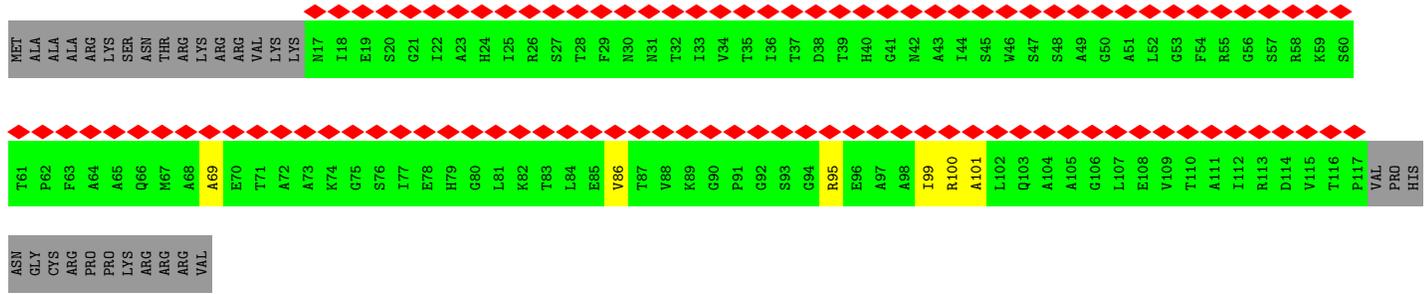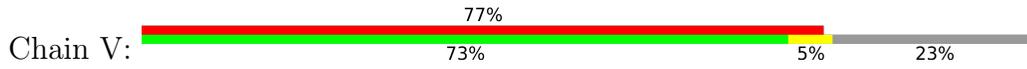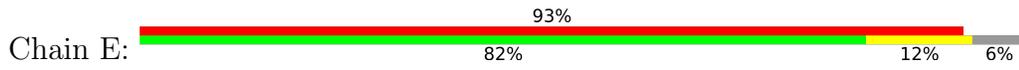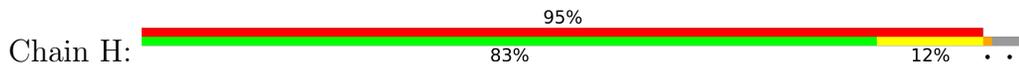

• Molecule 10: 30S ribosomal protein S16

Chain P:

MET A2 V3 K4 I5 R6 L7 K8 R9 A12 K13 K14 S15 Y18 R19 V22 S25 R26 S27 P28 R29 D30 G31 I34 Y40 A44 K45 E48 E53 E54 W59 L60 D68 R71 F74 Q77 G78 I79 M80 E81 K82 F83 Q88 G89 LYS

• Molecule 11: 30S ribosomal protein S17

29%

Chain Q: 72%   20%   • • •

MET S2 E3 R4 R7 K8 V9 Y10 Q11 V15 S16 D17 K18 M19 D20 K21 T22 V26 V27 E28 T29 Y30 K31 K32 R39 V40 K41 Y42 S43 K44 K45 F46 H49 D50 E51 N52 N53 K56 T66 R67 P68 L69 S70 A71 T72 K73 R74 L77 V78 E79 E83

A84 V85 ILE ILE

• Molecule 12: 30S ribosomal protein S20

38%

Chain S: 68%   23%   •   6%

MET PRO ASN I4 A7 I8 K9 R10 T11 K12 T13 N14 N15 E16 R17 R18 N21 A22 T23 I24 K25 M28 R29 I32 K33 Q34 V35 E36 A40 N41 N42 D45 K46 A47 K48 T49 A50 E53 R57 I58 D59 K60 A61 V62 K63 T64 G65 L66 V67 H68 K69 N70

T71 A72 A73 R74 Y75 R78 L79 K82 V83 N84 G85 L86 SER ALA

• Molecule 13: 30S ribosomal protein S6

79%

Chain T: 86%   12%   •

M1 R2 K3 Y4 E5 V6 M7 Y8 I9 I10 I14 D15 E16 E17 S18 K19 K20 A21 V22 I23 E24 R25 F26 N27 N28 V29 L30 T31 S32 N33 G34 A35 E36 I37 T40 K41 D42 W43 G44 K45 R46 R47 L48 A49 Y50 E51 I52 N53 D54 F55 R56 D57 G58 F59 Y60 Q61 I62 V63

N64 V65 Q66 S67 D68 A69 A70 A71 V72 Q73 E74 F75 D76 R77 L78 A79 K80 I81 S82 D83 D84 I85 I86 R87 H88 I89 V90 E93 E94 E95

• Molecule 14: 30S ribosomal protein S18

65%

Chain U: 62%   18%   •   19%

MET ALA GLY GLY ARG GLY GLY ARG ALA LYS ARG ARG K14 V15 C16 Y17 F18 T19 S20 N21 G22 I23 T24 H25 I26 D27 Y28 K29 D30 V31 D32 L33 L34 K35 K36 F37 V38 S39 E40 R41 G42 K43 I44 L45 P46 R47 R48 V49 T50 G51 T52 N53 A54 K55 Y56 Q57 R58 K59 L60

A63 A67 R68 Q69 M70 A71 L72 L73 P74 Y75 V76 S77 GLY GLU

• Molecule 15: 30S ribosomal protein S11

Chain V:

• Molecule 16: 30S ribosomal protein S3

Chain E:

• Molecule 17: 30S ribosomal protein S7

Chain H:

• Molecule 18: 30S ribosomal protein S9

Chain J:

MET ALA GLN VAL Q5 Y6 Y7 G8 T9 G10 R11 R12 K13 S14 S15 V16 A17 R18 V19 R20 L21 V22 P23 G24 E25 G26 R27 I28 V29 V30 N31 N32 R33 E34 I35 S36 E37 H38 I39 P40 S41 A42 A43 L44 I45 E46 D47 I48 K49 Q50 P51 L52 T53 L54 T55 T57 E56 A58 G59 T60

Y61 D62 V63 L64 V65 N66 V67 H68 G69 G70 G71 L72 S73 G74 Q75 A76 C77 A78 I79 R80 H81 G82 I83 A84 R85 A86 L87 L88 E89 A90 D91 P92 E93 Y94 R95 T96 T97 L98 K99 R100 A101 G102 L103 L104 T105 R106 D107 A108 R109 M110 K111 E112 ARG LYS TYR GLY LEU LYS GLY

ALA ARG ARG PRO GLN PHE SER LYS ARG

• Molecule 19: 30S ribosomal protein S10

Chain K: 93%   82%   9% · 7%

MET ALA LYS GLN LYS I6 R7 I8 R9 L10 K11 A12 Y13 D14 H15 R16 I17 L18 D19 Q20 S21 A22 E23 K24 I25 V26 E27 T28 A29 K30 R31 S32 G33 A34 S35 V36 S37 G38 P39 I40 P41 L42 P43 T44 E45 K46 S47 V48 Y49 T50 I51 L52 R53 A54 V55 H56 K57 Y58 K59 D60

S61 R62 E63 Q64 F65 E66 M67 R68 T69 H70 K71 R72 L73 I74 D75 I76 V77 N78 P79 T80 P81 Q82 T83 V84 D85 A86 L87 M88 R89 L90 D91 L92 P93 S94 G95 V96 D97 I98 E99 I100 LYS LEU

• Molecule 20: 30S ribosomal protein S13

Chain M: 89%   81%   8%   11%

MET ALA R3 I4 A5 G6 V7 D8 I9 P10 R11 D12 K13 R14 V15 V16 I17 S18 L19 T20 Y21 I22 F23 G24 I25 G26 R27 T28 T29 A30 Q31 Q32 V33 L34 K35 E36 A37 G38 V39 S40 E41 D42 T43 R44 V45 R46 D47 L48 T49 E50 E51 E52 L53 G54 K55 I56 R57 D58 I59 I60

D61 K62 L63 K64 V65 E66 G67 D68 L69 R70 R71 E72 V73 S74 L75 N76 I77 K78 R79 L80 I81 E82 I83 G84 S85 Y86 R87 G88 I89 R90 H91 R92 R93 G94 L95 P96 V97 R98 G99 Q100 N101 S102 K103 N104 N105 A106 R107 T108 R109 K110 GLY PRO ARG ARG THR VAL ALA ASN LYS LYS

LYS

• Molecule 21: 30S ribosomal protein S14

Chain N: 80%   67%   11% · 20%

MET ALA LYS LYS SER MET ILE ALA LYS GLN GLN ARG T13 P14 K15 F16 K17 V18 Q19 E20 Y21 T22 R23 C24 E25 R26 C27 G28 R29 P30 H31 S32 V33 I34 R35 K36 F37 K38 L39 C40 R41 I42 C43 F44 R45 E46 L47 A48 Y49 K50 G51 Q52 I53 P54 G55 V56 K57 K58 A59 S60

W61

• Molecule 22: 30S ribosomal protein S19

Chain R: 85%   66%   17% · 15%

MET ALA ARG S4 L5 K6 K7 G8 P9 F10 V11 D12 G13 H14 L15 M16 T17 K18 I19 E20 K21 L22 N23 E24 T25 D26 K27 K28 Q29 V30 V31 K32 T33 W34 S35 R36 R37 S38 T39 I40 F41 P42 Q43 F44 I45 G46 H47 T48 I49 A50 V51 Y52 D53 G54 R55 K56 H57 V58 P59 V60

F61 I62 S63 E64 D65 M66 V67 G68 H69 K70 L71 G72 E73 F74 A75 P76 T77 R78 T79 Y80 K81 GLY HIS ALA SER ASP ASP LYS LYS THR ARG ARG
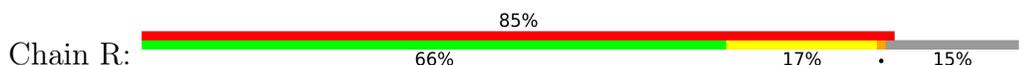
4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	6540	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 $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	900	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.047	Depositor
Minimum map value	-0.034	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.0103	Depositor
Map size (Å)	307.2, 307.2, 307.2	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8, 0.8, 0.8	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	0.58	1/32015 (0.0%)	0.97	17/49936 (0.0%)
2	B	0.69	0/174	1.89	8/269 (3.0%)
3	C	0.32	0/5748	0.68	1/7760 (0.0%)
4	D	0.36	0/1782	0.85	2/2392 (0.1%)
5	F	0.47	0/1517	1.00	0/2036
6	G	0.50	0/1182	1.08	4/1591 (0.3%)
7	I	0.55	0/1048	1.10	1/1407 (0.1%)
8	L	0.52	0/1069	1.08	2/1435 (0.1%)
9	O	0.48	0/718	1.09	2/960 (0.2%)
10	P	0.57	0/708	1.21	0/950
11	Q	0.52	0/699	1.20	3/933 (0.3%)
12	S	0.50	0/639	1.02	2/852 (0.2%)
13	T	0.39	0/795	0.93	3/1067 (0.3%)
14	U	0.43	0/526	0.99	3/705 (0.4%)
15	V	0.35	0/740	0.65	0/1002
16	E	0.35	0/1637	0.75	0/2203
17	H	0.34	0/1196	0.74	0/1604
18	J	0.36	0/836	0.75	0/1128
19	K	0.35	0/773	0.77	0/1044
20	M	0.34	0/873	0.74	0/1166
21	N	0.36	0/419	0.98	1/558 (0.2%)
22	R	0.33	0/649	0.75	0/872
All	All	0.51	1/55743 (0.0%)	0.94	49/81870 (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
3	C	0	6
4	D	0	4
5	F	0	4

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Mol	Chain	#Chirality outliers	#Planarity outliers
6	G	0	4
7	I	0	2
8	L	0	1
9	O	0	1
10	P	0	4
11	Q	0	2
12	S	0	3
16	E	0	5
18	J	0	2
20	M	0	1
All	All	0	39

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	946	C	O3'-P	6.11	1.68	1.61

The worst 5 of 49 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	9002	A	N1-C6-N6	-9.28	113.03	118.60
2	B	9002	A	O3'-P-O5'	-8.64	87.58	104.00
13	T	87	ARG	NE-CZ-NH1	8.02	124.31	120.30
2	B	9005	A	P-O3'-C3'	-7.79	110.35	119.70
2	B	9002	A	C5-C6-N6	7.62	129.79	123.70

There are no chirality outliers.

5 of 39 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	441	ARG	Sidechain
3	C	573	ARG	Sidechain
3	C	612	ARG	Sidechain
3	C	69	MET	Peptide,Mainchain
3	C	70	ASN	Peptide

5.2 Too-close contacts ⓘ

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	28597	0	14401	647	0
2	B	154	0	78	27	0
3	C	5650	0	5618	71	0
4	D	1757	0	1830	32	0
5	F	1490	0	1518	32	0
6	G	1170	0	1245	29	0
7	I	1036	0	1095	25	0
8	L	1052	0	1112	12	0
9	O	710	0	735	13	0
10	P	695	0	721	11	0
11	Q	691	0	728	12	0
12	S	637	0	696	16	0
13	T	784	0	777	7	0
14	U	518	0	555	10	0
15	V	730	0	735	3	0
16	E	1615	0	1655	7	0
17	H	1181	0	1235	20	0
18	J	826	0	849	6	0
19	K	761	0	795	4	0
20	M	868	0	925	5	0
21	N	409	0	427	4	0
22	R	633	0	649	9	0
All	All	51964	0	38379	914	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 10.

The worst 5 of 914 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:1002:U:H2'	1:A:1053:G:H1	1.08	1.09
3:C:119:GLN:OE1	17:H:150:ALA:C	1.86	1.07
3:C:119:GLN:OE1	17:H:149:LYS:O	1.73	1.07
1:A:1002:U:H2'	1:A:1053:G:N1	1.69	1.05
1:A:1140:A:OP2	1:A:1140:A:H3'	1.59	1.02

There are no symmetry-related clashes.

5.3　Torsion angles ⓘ

5.3.1　Protein backbone ⓘ

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	
3	C	706/779 (91%)	694 (98%)	11 (2%)	1 (0%)	51	85
4	D	216/246 (88%)	199 (92%)	16 (7%)	1 (0%)	29	68
5	F	179/200 (90%)	156 (87%)	19 (11%)	4 (2%)	6	38
6	G	156/166 (94%)	140 (90%)	14 (9%)	2 (1%)	12	48
7	I	129/132 (98%)	114 (88%)	11 (8%)	4 (3%)	4	32
8	L	134/138 (97%)	126 (94%)	8 (6%)	0	100	100
9	O	83/89 (93%)	71 (86%)	12 (14%)	0	100	100
10	P	86/90 (96%)	80 (93%)	6 (7%)	0	100	100
11	Q	82/87 (94%)	76 (93%)	4 (5%)	2 (2%)	6	36
12	S	81/88 (92%)	72 (89%)	9 (11%)	0	100	100
13	T	93/95 (98%)	86 (92%)	6 (6%)	1 (1%)	14	52
14	U	62/79 (78%)	60 (97%)	2 (3%)	0	100	100
15	V	99/131 (76%)	93 (94%)	6 (6%)	0	100	100
16	E	203/218 (93%)	169 (83%)	33 (16%)	1 (0%)	29	68
17	H	147/156 (94%)	138 (94%)	7 (5%)	2 (1%)	11	47
18	J	106/130 (82%)	100 (94%)	6 (6%)	0	100	100
19	K	93/102 (91%)	88 (95%)	5 (5%)	0	100	100
20	M	106/121 (88%)	102 (96%)	4 (4%)	0	100	100
21	N	47/61 (77%)	43 (92%)	3 (6%)	1 (2%)	7	39
22	R	76/92 (83%)	72 (95%)	2 (3%)	2 (3%)	5	35
All	All	2884/3200 (90%)	2679 (93%)	184 (6%)	21 (1%)	26	62

5 of 21 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	130	PRO

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Mol	Chain	Res	Type
5	F	181	GLU
5	F	182	ARG
7	I	4	THR
22	R	27	LYS

5.3.2   Protein sidechains ⓘ

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	
3	C	628/692 (91%)	624 (99%)	4 (1%)	86	92
4	D	189/212 (89%)	186 (98%)	3 (2%)	62	79
5	F	159/173 (92%)	153 (96%)	6 (4%)	33	58
6	G	123/130 (95%)	119 (97%)	4 (3%)	38	61
7	I	111/112 (99%)	104 (94%)	7 (6%)	18	45
8	L	114/116 (98%)	112 (98%)	2 (2%)	59	76
9	O	80/83 (96%)	75 (94%)	5 (6%)	18	45
10	P	74/76 (97%)	73 (99%)	1 (1%)	67	80
11	Q	77/80 (96%)	73 (95%)	4 (5%)	23	50
12	S	66/70 (94%)	64 (97%)	2 (3%)	41	63
13	T	84/84 (100%)	81 (96%)	3 (4%)	35	60
14	U	56/64 (88%)	53 (95%)	3 (5%)	22	49
15	V	74/100 (74%)	73 (99%)	1 (1%)	67	80
16	E	168/178 (94%)	157 (94%)	11 (6%)	17	44
17	H	125/132 (95%)	118 (94%)	7 (6%)	21	48
18	J	85/102 (83%)	80 (94%)	5 (6%)	19	47
19	K	86/92 (94%)	78 (91%)	8 (9%)	9	30
20	M	94/104 (90%)	92 (98%)	2 (2%)	53	71
21	N	44/54 (82%)	41 (93%)	3 (7%)	16	43
22	R	70/81 (86%)	65 (93%)	5 (7%)	14	41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	2507/2735 (92%)	2421 (97%)	86 (3%)	40 60

5 of 86 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
17	H	9	LYS
19	K	57	LYS
17	H	30	MET
18	J	100	ARG
19	K	98	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 15 such sidechains are listed below:

Mol	Chain	Res	Type
14	U	21	ASN
20	M	104	ASN
15	V	42	ASN
22	R	14	HIS
18	J	75	GLN

5.3.3   RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1329/1554 (85%)	391 (29%)	113 (8%)
2	B	6/7 (85%)	3 (50%)	0
All	All	1335/1561 (85%)	394 (29%)	113 (8%)

5 of 394 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	9	G
1	A	11	G
1	A	15	U
1	A	24	G
1	A	32	C

5 of 113 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	827	G

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Mol	Chain	Res	Type
1	A	1306	U
1	A	980	C
1	A	1294	A
1	A	1177	C

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 ⓘ

There are no monosaccharides in this entry.

5.6   Ligand geometry ⓘ

There are no ligands in this entry.

5.7   Other polymers ⓘ

There are no such residues in this entry.

5.8   Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-16606. 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 ⓘ
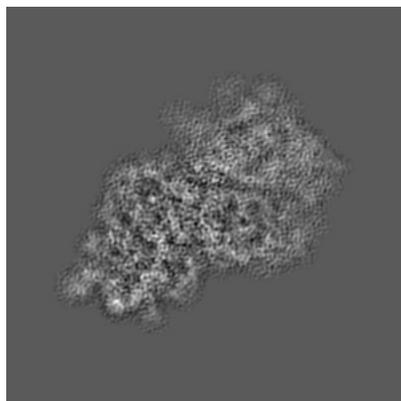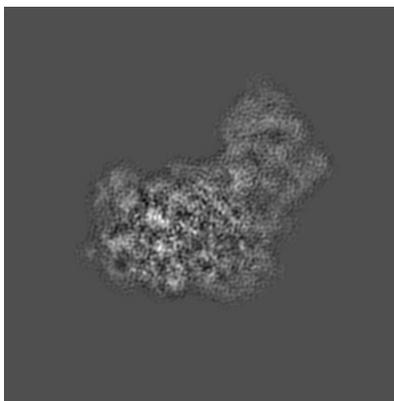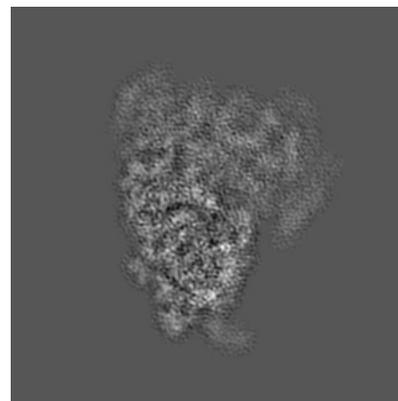
6.1.1 Primary map

X   Y   Z

6.1.2 Raw map

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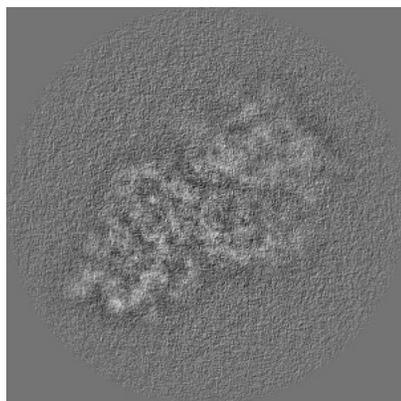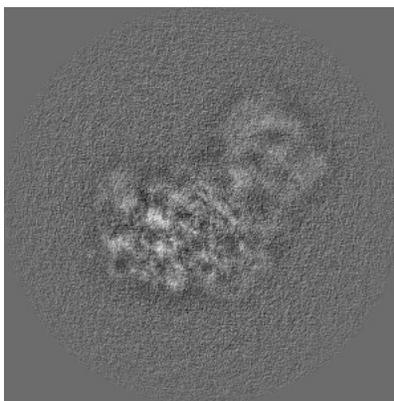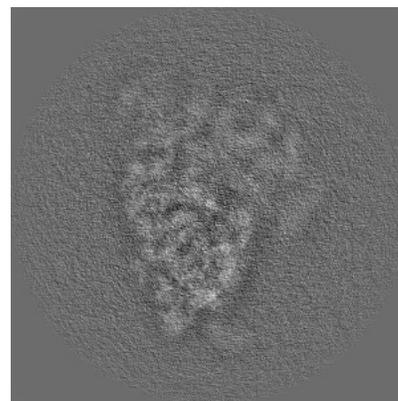
The images above show the map projected in three orthogonal directions.

6.2   Central slices ⓘ
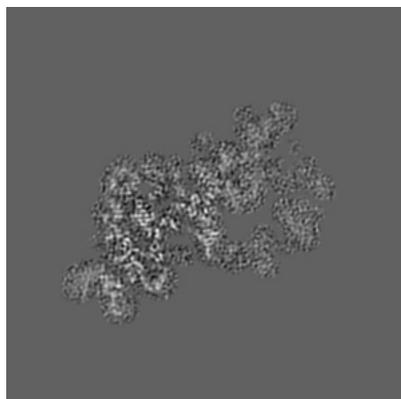
6.2.1   Primary map
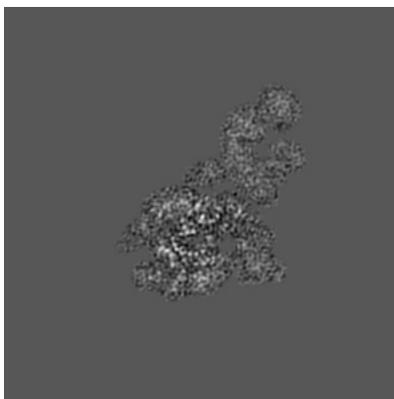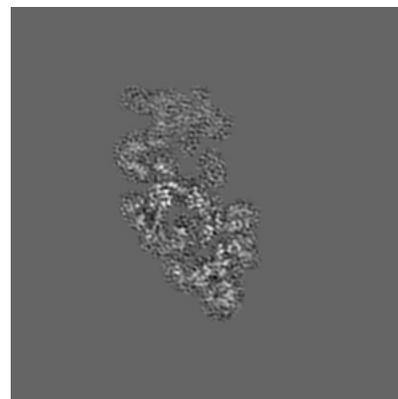
| X Index: 192 | Y Index: 192 | Z Index: 192 |

6.2.2   Raw map
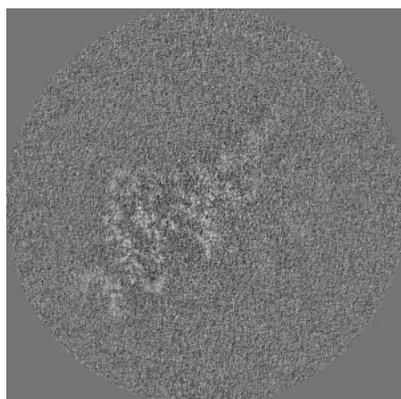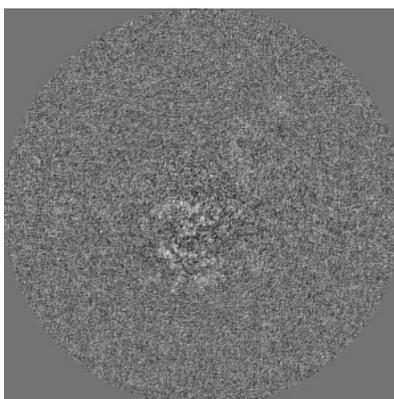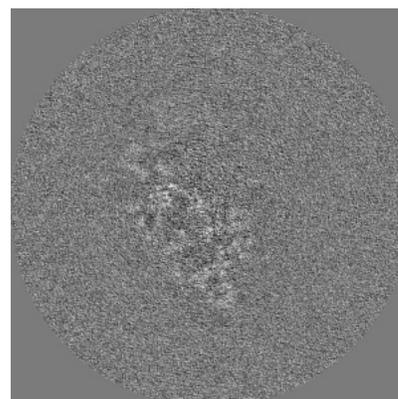
| X Index: 192 | Y Index: 192 | Z Index: 192 |

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

6.3 Largest variance slices (i)

6.3.1 Primary map
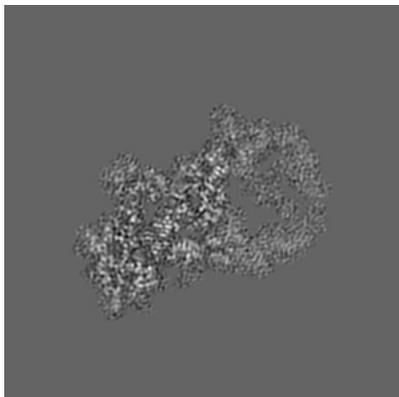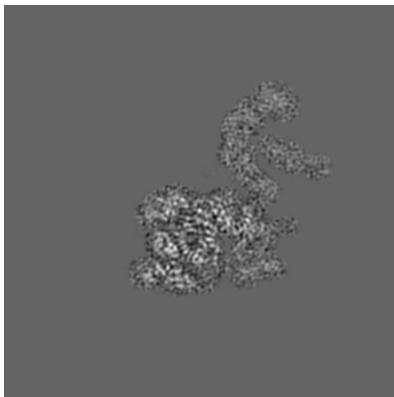
| X Index: 176 | Y Index: 199 | Z Index: 162 |
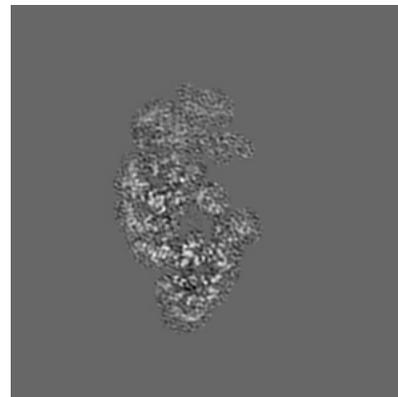
6.3.2 Raw map
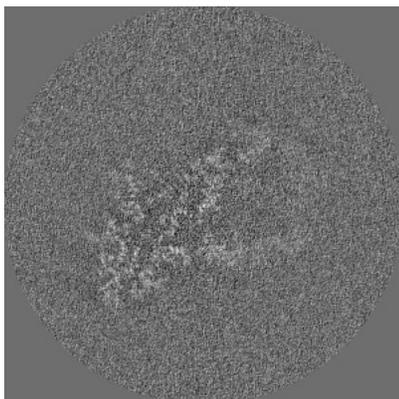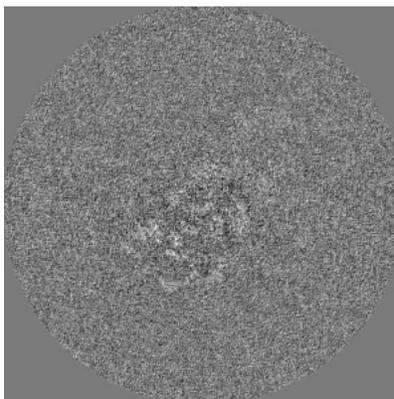
| X Index: 181 | Y Index: 184 | Z Index: 189 |
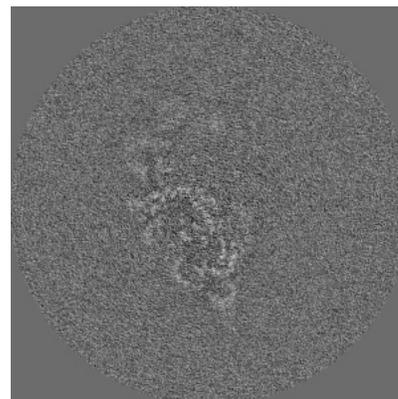
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1 Primary map
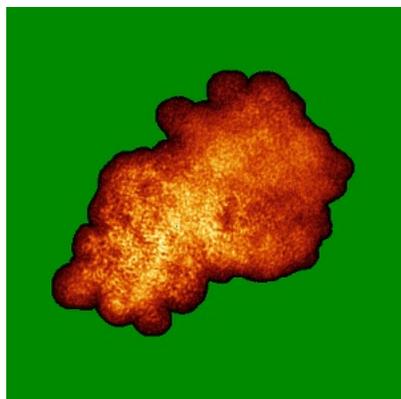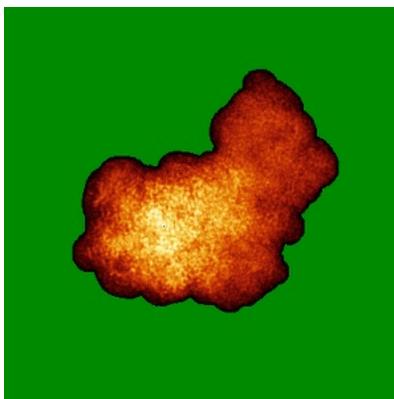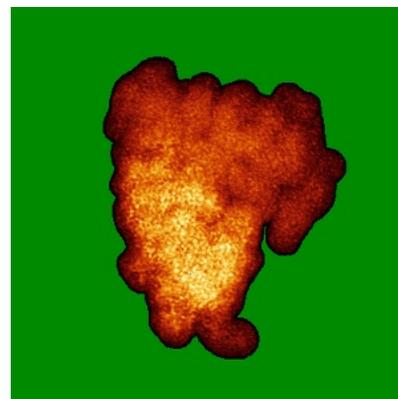
X   Y   Z

6.4.2 Raw map

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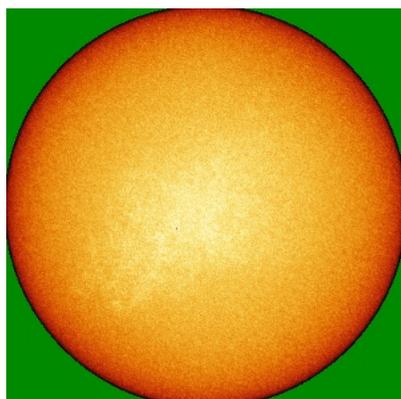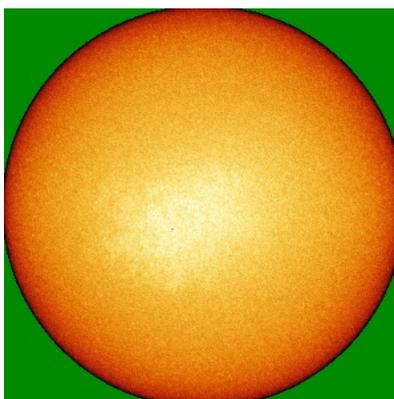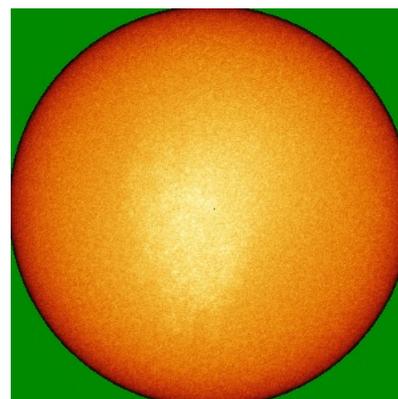
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

X   Y   Z
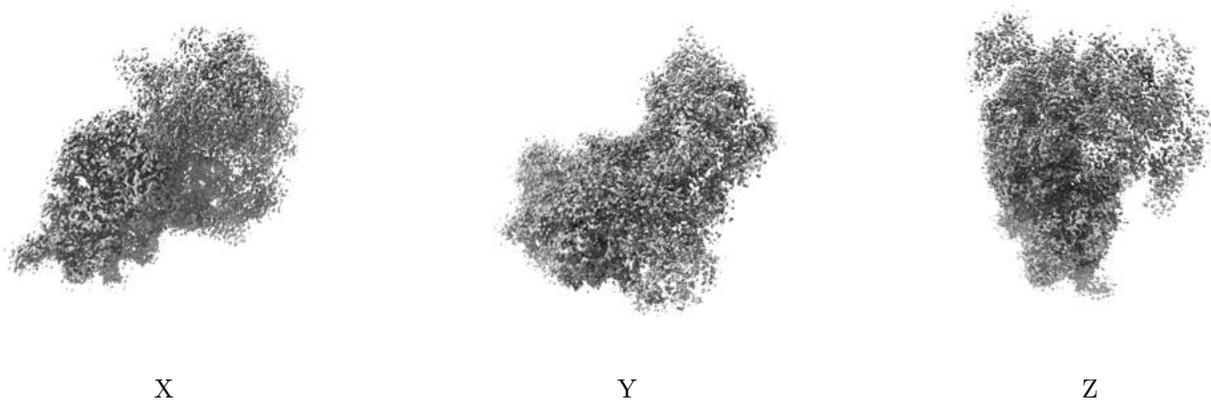
The images above show the 3D surface view of the map at the recommended contour level 0.0103. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

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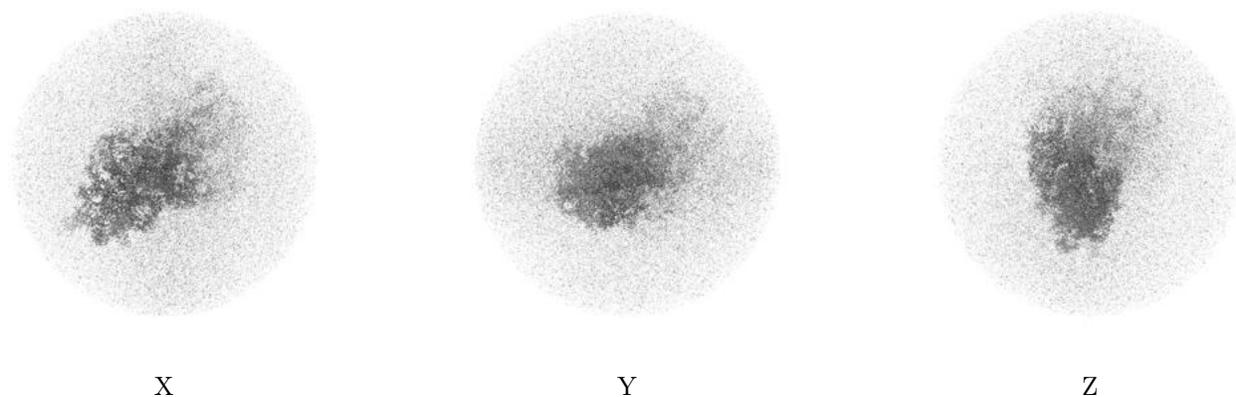
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation ⓘ

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

7   Map analysis ⓘ

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

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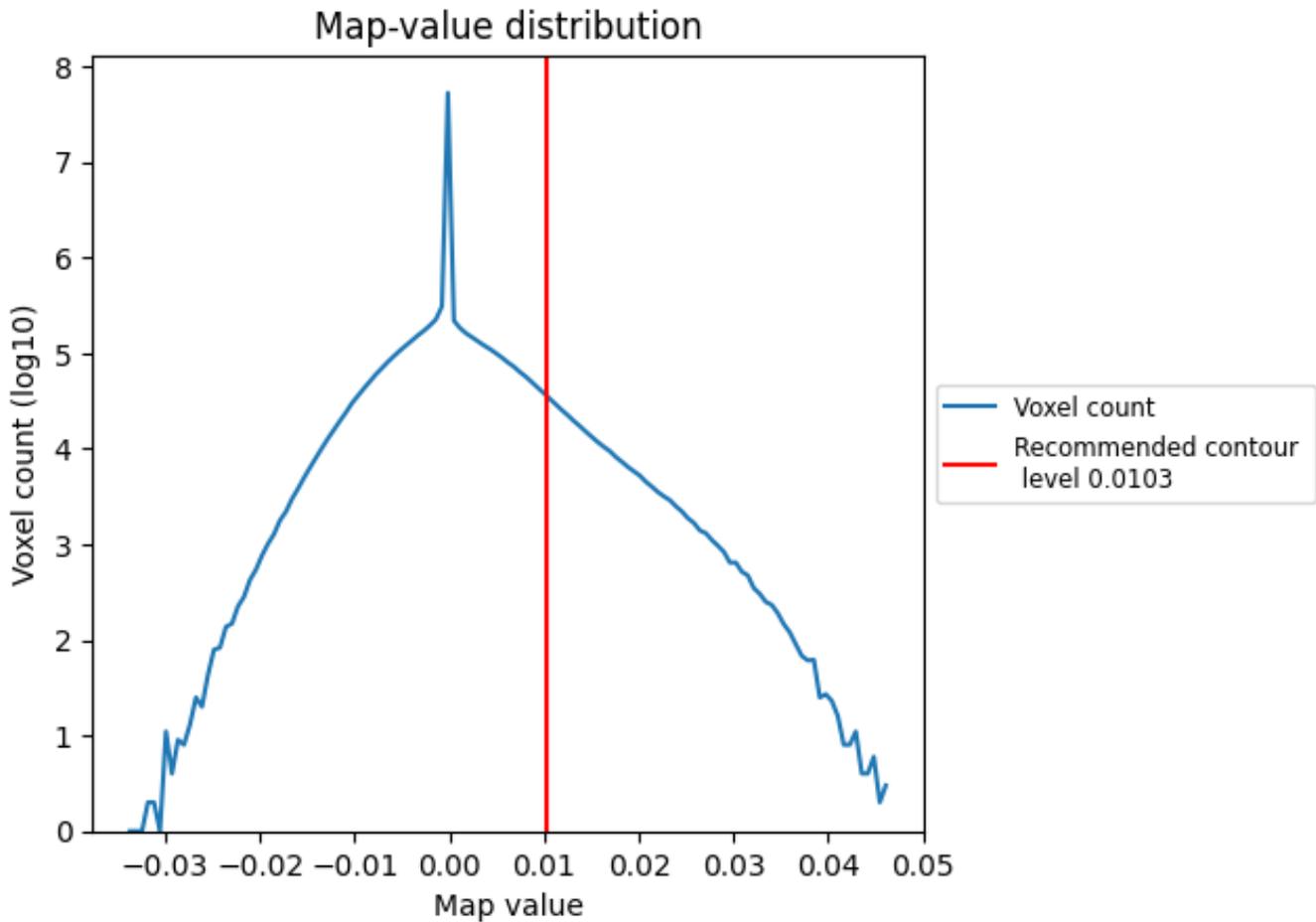
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
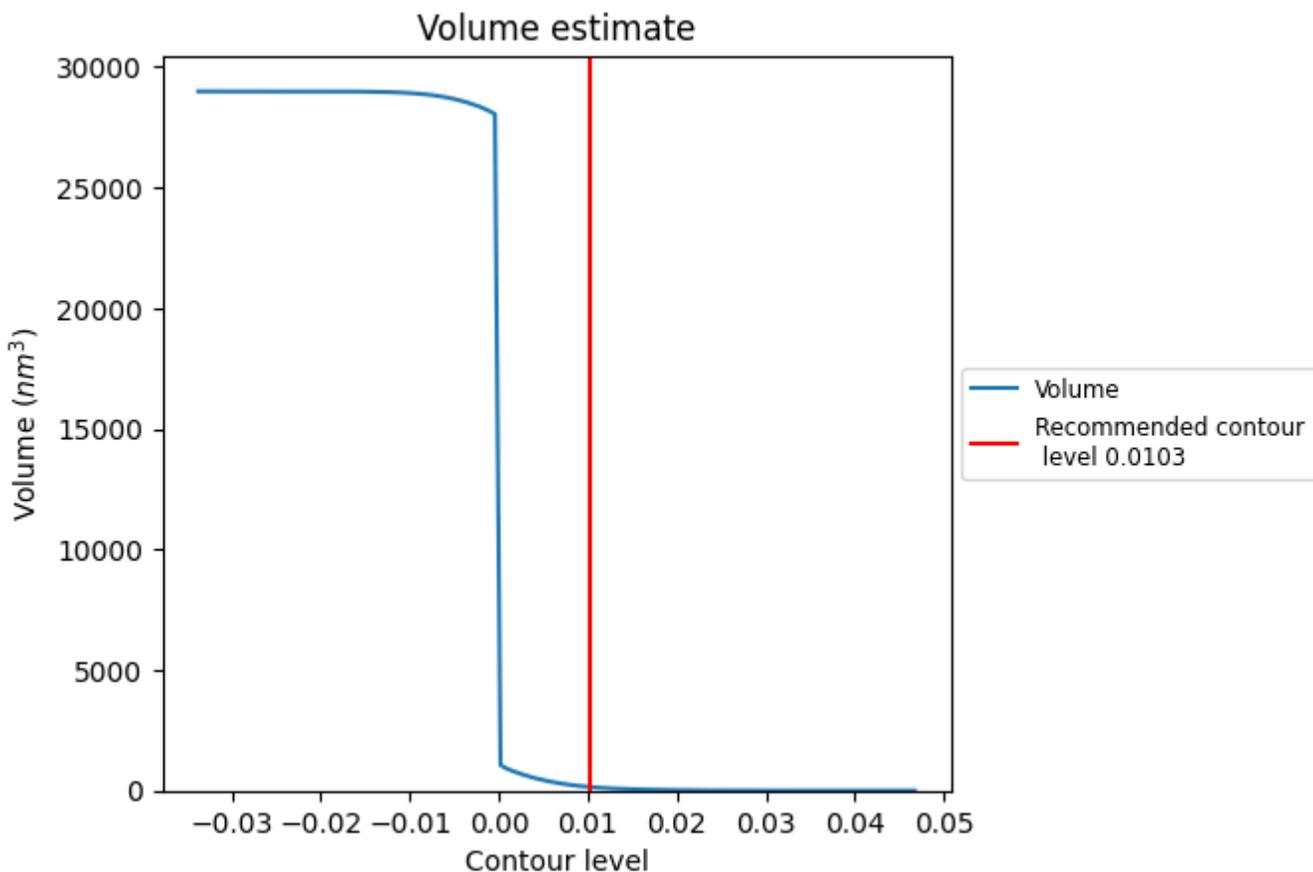
The volume at the recommended contour level is 150 nm^3; this corresponds to an approximate mass of 136 kDa.

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 ⓘ
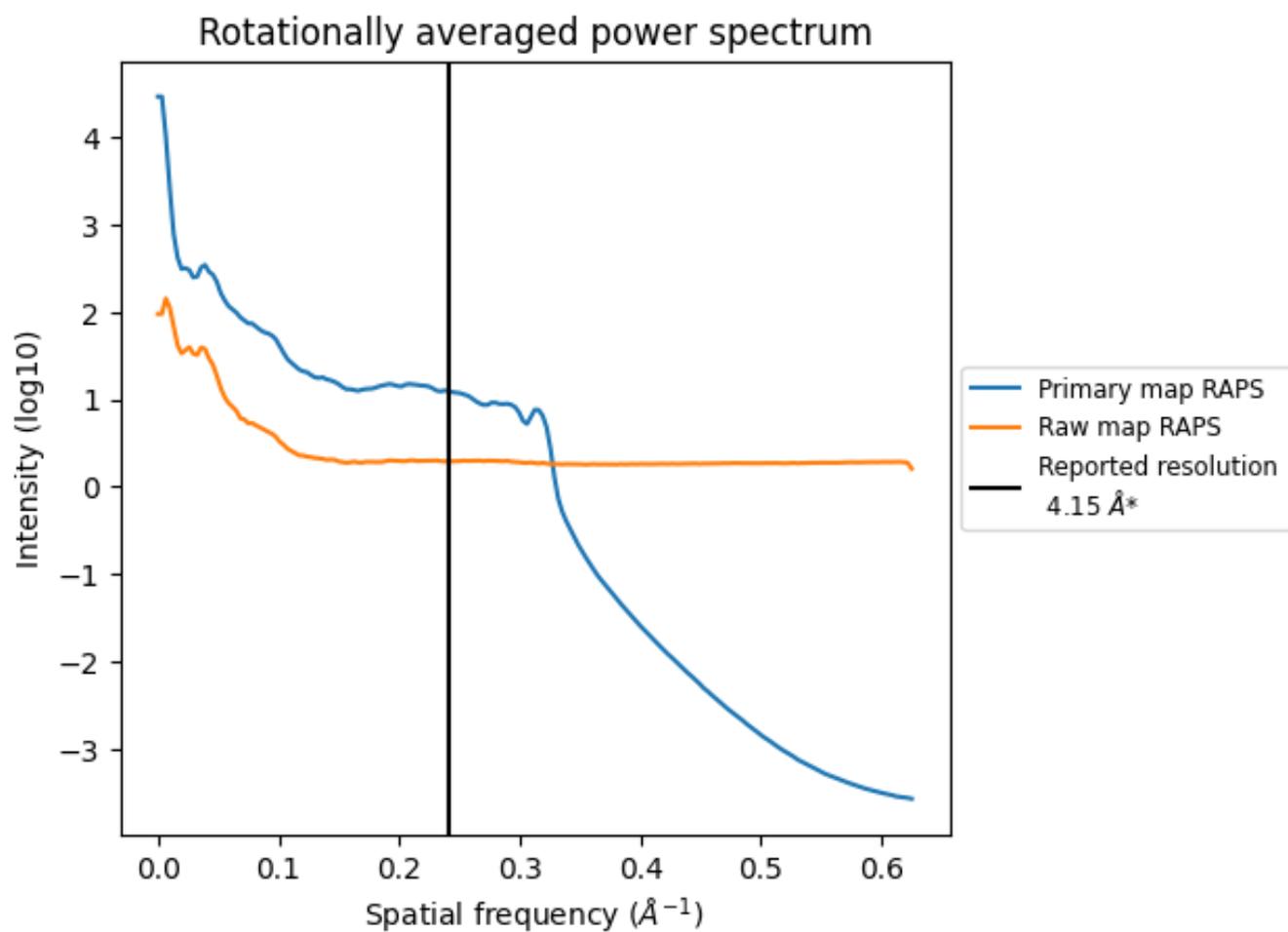
*Reported resolution corresponds to spatial frequency of 0.241 Å^{-1}

8   Fourier-Shell correlation ⓘ

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 ⓘ
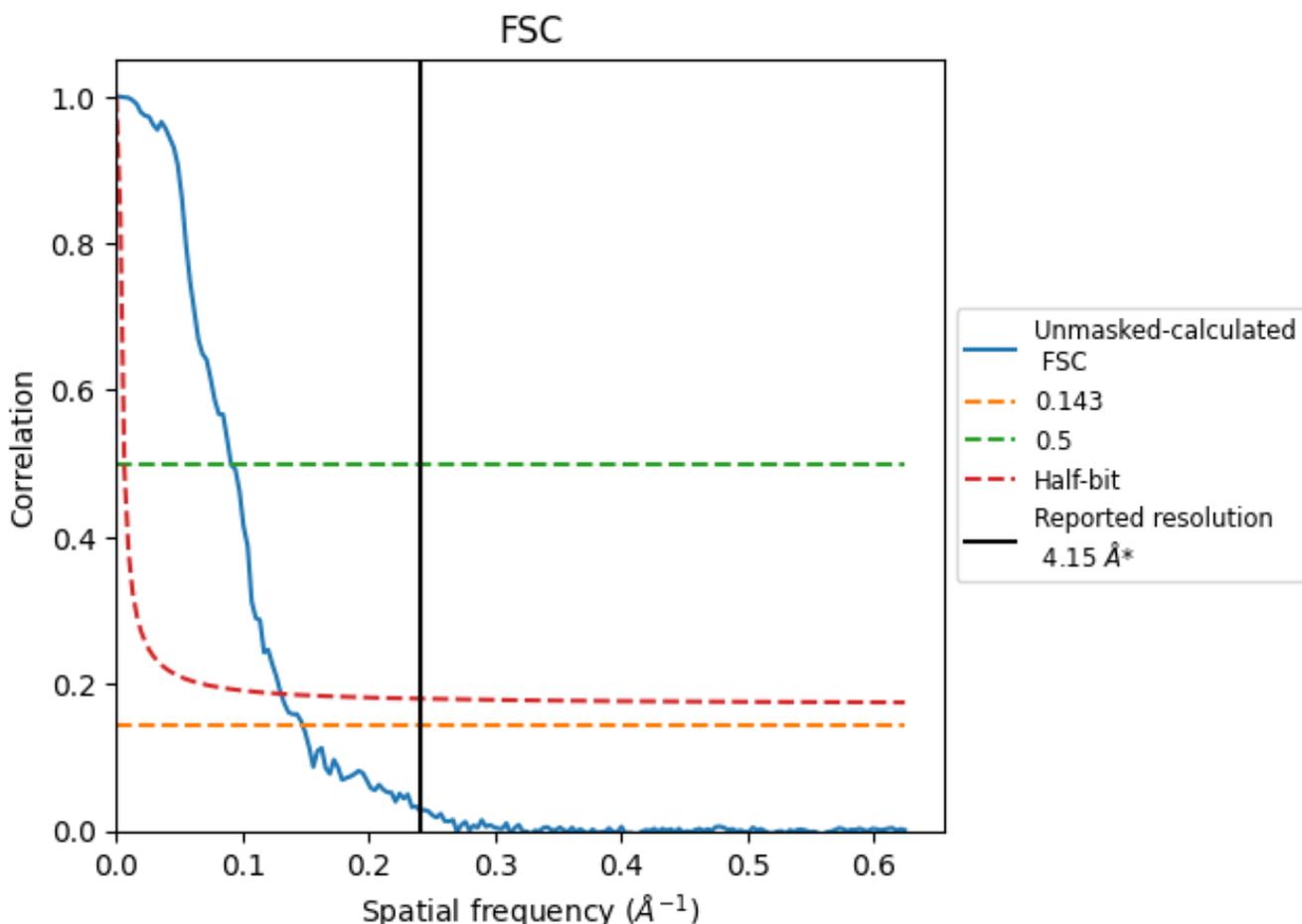
*Reported resolution corresponds to spatial frequency of 0.241 Å^{-1}

8.2   Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.15	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.77	11.00	7.66

*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 6.77 differs from the reported value 4.15 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-16606 and PDB model 8CED. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay ⓘ
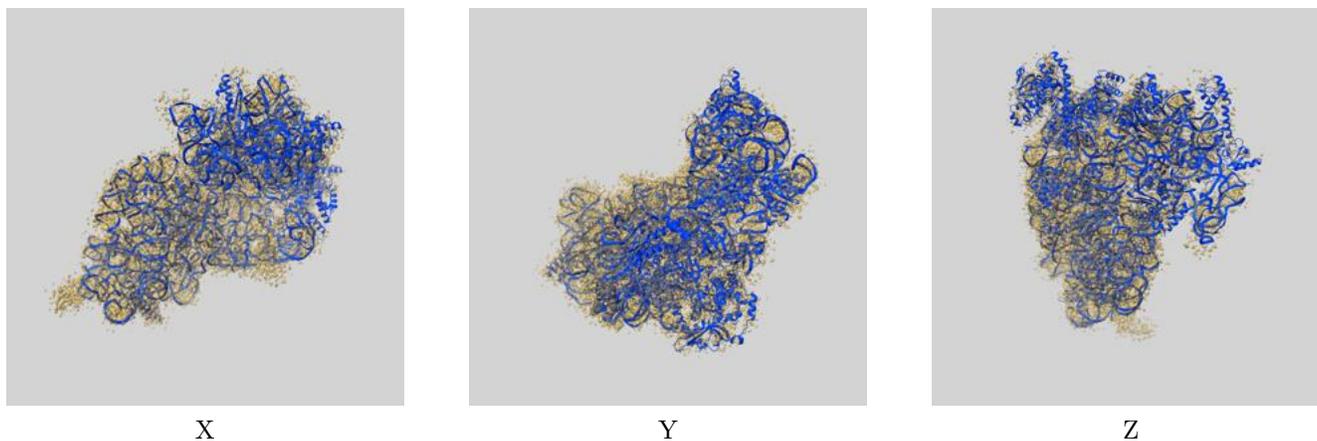
| X | Y | Z |

The images above show the 3D surface view of the map at the recommended contour level 0.0103 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 ⓘ

X　　　　　　　　　　　Y　　　　　　　　　　　Z

The images above show the model with each residue coloured according 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 ⓘ

X　　　　　　　　　　　Y　　　　　　　　　　　Z
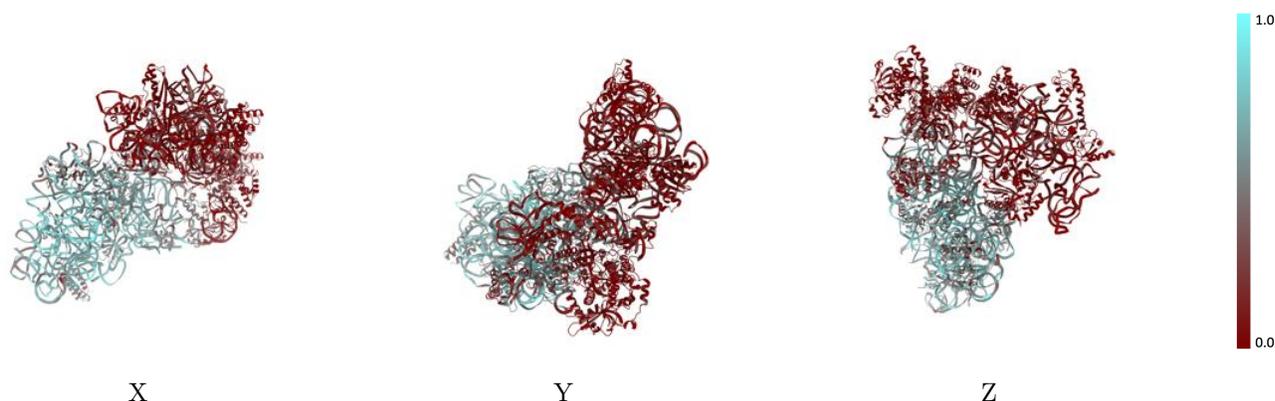
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.0103).

9.4   Atom inclusion ⓘ
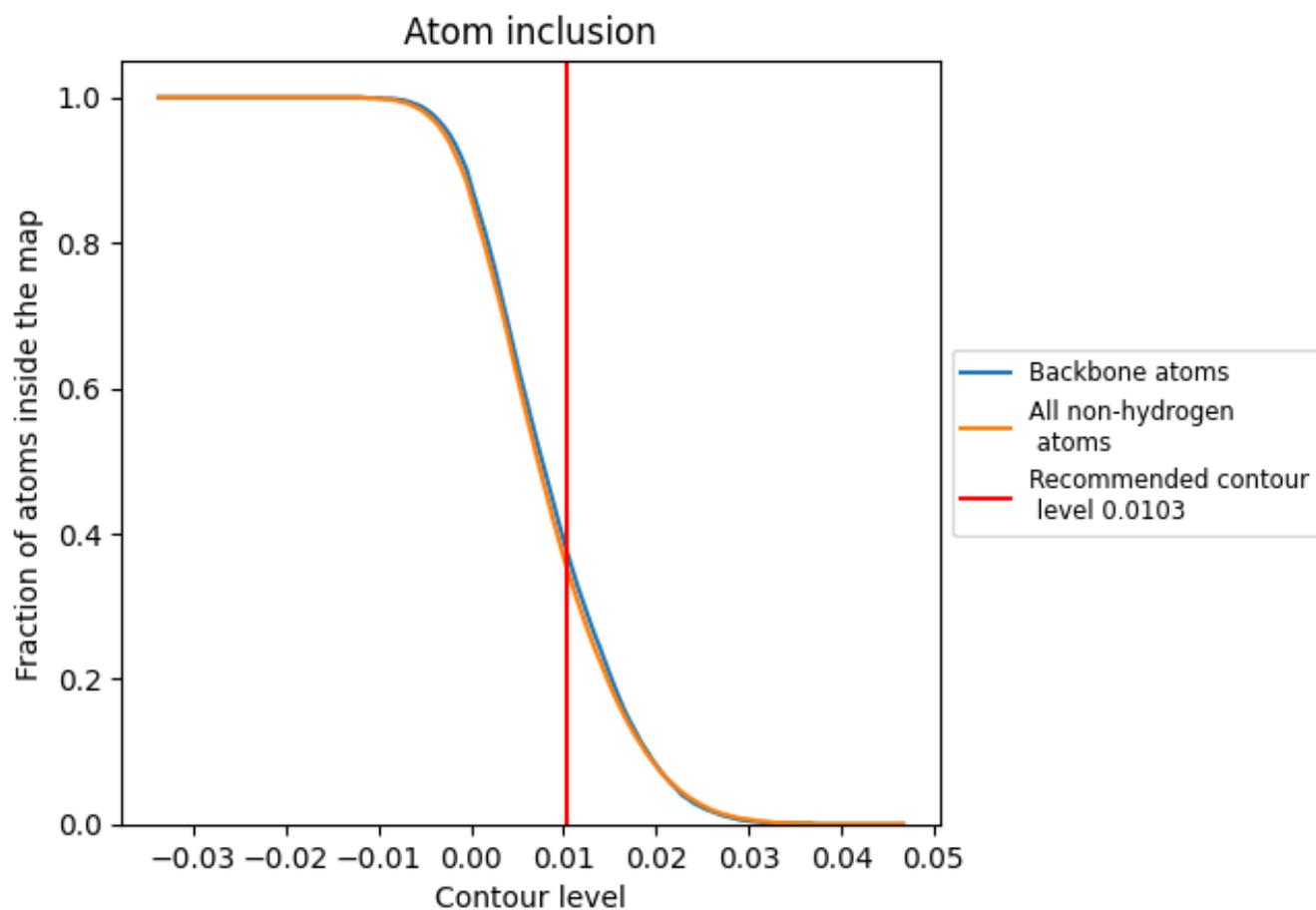
At the recommended contour level, 38% of all backbone atoms, 36% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.0103) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.3550	0.2650
A	0.4740	0.3270
B	0.0520	0.0890
C	0.0440	0.0570
D	0.1900	0.2050
E	0.0560	0.0770
F	0.4000	0.3750
G	0.4890	0.3940
H	0.0470	0.0390
I	0.5210	0.4230
J	0.0750	0.0940
K	0.0310	0.0380
L	0.4870	0.3960
M	0.0200	0.0340
N	0.0510	0.0960
O	0.5260	0.3770
P	0.5720	0.4680
Q	0.4980	0.4160
R	0.0150	0.0280
S	0.4520	0.3540
T	0.2310	0.2120
U	0.2630	0.2570
V	0.0260	0.0980

1.0

0.0

<0.0