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[Portal](#) [Simbad](#) [VizieR](#) [Aladin](#) [X-Match](#) [Other](#) [Help](#)**J/MNRAS/450/1900** Chemical abundances of 257 giant stars (Adibekyan+, 2015)

Chemical abundances and kinematics of 257 G-, K-type field giants.
Setting a base for further analysis of giant-planet properties orbiting evolved stars.

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Israelian G., Sousa S.G., Tsantaki M., Mortier A., Sozzetti A.,
De Medeiros J.R.

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=[2015MNRAS.450.1900A](#)

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stars: abundances - planetary systems

Abstract:

We performed a uniform and detailed abundance analysis of 12 refractory elements for a sample of 257 G- and K-type evolved stars from the CORALIE planet search program. This sample, being homogeneously analyzed, can be used as a comparison sample for other planet-related studies, as well as for different type of studies related to stellar and Galaxy astrophysics. The abundances of the chemical elements were determined using an LTE abundance analysis relative to the Sun, with the spectral synthesis code MOOG and a grid of Kurucz ATLAS9 atmospheres. To separate the Galactic stellar populations both a purely kinematical approach and a chemical method were applied.

Description:

The file ew.dat lists the equivalent widths (EW) of all the spectral lines. Columns 1, 2, and 3 list the name of the stars, wavelength and EWs of the lines.

The file linelist.dat lists the lines that were used in this study. The last column shows the difference (in n*sigma) between chemical abundances of giant and dwarf stars with solar metallicity derived from each line.

The file table2.dat lists the derived abundances of the elements, rms, and number of measured lines for each star.

The file ab_best.dat lists the abundances of the elements derived by using the "best" linelist.

The file vel.dat lists the parameters used to assign the Galactic population to which each star belongs. Galactic space velocity components and the probabilities to assign the stellar population to which each star belongs according to Bensby ([2003A&A...410..527B](#)) and Robin ([2003A&A...409..523R](#)) criteria.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
table2.dat	348	257	Abundances, rms, error, and number of lines for each star and element
ab_best.dat	80	257	Abundances for each star and element derived by using only the "best" lines
vel.dat	65	183	Parameters to assign the stars to a Galactic population
ew.dat	22	30228	Equivalent widths of the spectral lines used to derive abundances
linelist.dat	28	118	Atomic parameters for lines selected in the paper

See also:

[J/A+A/410/527](#) : Abundances in the Galactic disk (Bensby+, 2003)
[J/A+A/418/551](#) : Galactic disk stars abund. & velocities (Mishenina+, 2004)
[J/MNRAS/367/1329](#) : Elemental abundances for 176 stars (Reddy+, 2006)
[J/A+A/497/563](#) : Chemical abundances of 451 stars (Neves+, 2009)
[J/A+A/545/A32](#) : Chemical abundances of 1111 FGK stars (Adibekyan+, 2012)

Byte-by-byte Description of file: [table2.dat](#)

Bytes	Format	Units	Label	Explanations
1- 8	A8	---	Star	Star's identifier
10- 14	F5.2	[Sun]	[Na/H]	? Abundance [Na/H] (Z=11) (G1) (1)
16- 19	F4.2	[Sun]	e_[Na/H]	rms uncertainty of [Na/H]
21- 24	F4.2	[Sun]	s_[Na/H]	Total error of [Na/H]
26- 30	F5.2	[Sun]	[Na/H]c	Abundance [Na/H] after correction for effective temperature trend (2)

32	I1	---	o_[Na/H]	Number of Na lines used
34- 38	F5.2	[Sun]	[Mg/H]	Abundance [Mg/H] (Z=12) (G1) (1)
40- 43	F4.2	[Sun]	e_[Mg/H]	rms uncertainty of [Mg/H]
45- 48	F4.2	[Sun]	s_[Mg/H]	Total error of [Mg/H]
50- 54	F5.2	[Sun]	[Mg/H]c	Abundance [Mg/H] after correction for effective temperature trend (2)
56	I1	---	o_[Mg/H]	Number of MgI lines used
58- 62	F5.2	[Sun]	[Al/H]	? Abundance [Al/H] (Z=13) (G1) (1)
64- 67	F4.2	[Sun]	e_[Al/H]	? rms uncertainty of [Al/H]
69- 72	F4.2	[Sun]	s_[Al/H]	Total error of [Al/H]
74- 78	F5.2	[Sun]	[Al/H]c	Abundance [Al/H] after correction for effective temperature trend (2)
80	I1	---	o_[Al/H]	? Number of AlI lines used
82- 86	F5.2	[Sun]	[Si/H]	Abundance [Si/H] (Z=14) (G1)
88- 91	F4.2	[Sun]	e_[Si/H]	rms uncertainty of [Si/H]
93- 96	F4.2	[Sun]	s_[Si/H]	Total error of [Si/H]
98-102	F5.2	[Sun]	[Si/H]c	Abundance [Si/H] after correction for effective temperature trend (2)
104-105	I2	---	o_[Si/H]	Number of SiI lines used
107-111	F5.2	[Sun]	[Ca/H]	Abundance [Ca/H] (Z=20) (G1)
113-116	F4.2	[Sun]	e_[Ca/H]	rms uncertainty of [Ca/H]
118-121	F4.2	[Sun]	s_[Ca/H]	Total error of [Ca/H]
123-124	I2	---	o_[Ca/H]	Number of CaI lines used
126-130	F5.2	[Sun]	[ScI/H]	Abundance [ScI/H] (Z=21.0) (G1) (1)
132-135	F4.2	[Sun]	e_[ScI/H]	rms uncertainty of [ScI/H]
137-140	F4.2	[Sun]	s_[ScI/H]	Total error of [ScI/H]
142-146	F5.2	[Sun]	[ScI/H]c	Abundance [ScI/H] after correction for effective temperature trend (2)
148	I1	---	o_[ScI/H]	Number of ScI lines used
150-154	F5.2	[Sun]	[ScII/H]	Abundance [ScII/H] (Z=21.1) (G1)
156-159	F4.2	[Sun]	e_[ScII/H]	rms uncertainty of [ScII/H]
161-164	F4.2	[Sun]	s_[ScII/H]	Total error of [ScII/H]
166-170	F5.2	[Sun]	[ScII/H]c	Abundance [ScII/H] after correction for effective temperature trend (2)
172	I1	---	o_[ScII/H]	Number of ScII lines used
174-178	F5.2	[Sun]	[TiI/H]	Abundance [TiI/H] (Z=22.0) (G1)
180-183	F4.2	[Sun]	e_[TiI/H]	rms uncertainty of [TiI/H]
185-188	F4.2	[Sun]	s_[TiI/H]	Total error of [TiI/H]
190-191	I2	---	o_[TiI/H]	Number of TiI lines used
193-197	F5.2	[Sun]	[TiII/H]	Abundance [TiII/H] (Z=22.1) (G1)
199-202	F4.2	[Sun]	e_[TiII/H]	rms uncertainty of [TiII/H]
204-207	F4.2	[Sun]	s_[TiII/H]	Total error of [TiII/H]
209	I1	---	o_[TiII/H]	Number of TiII lines used
211-215	F5.2	[Sun]	[V/H]	Abundance [V/H] (Z=23) (G1)
217-220	F4.2	[Sun]	e_[V/H]	rms uncertainty of [V/H]
222-225	F4.2	[Sun]	s_[V/H]	Total error of [V/H]
227-231	F5.2	[Sun]	[V/H]c	Abundance [V/H] after correction for effective temperature trend (2)
233	I1	---	o_[V/H]	Number of VI lines used
235-239	F5.2	[Sun]	[CrI/H]	Abundance [CrI/H] (Z=24.0) (G1)
241-244	F4.2	[Sun]	e_[CrI/H]	rms uncertainty of [CrI/H]
246-249	F4.2	[Sun]	s_[CrI/H]	Total error of [CrI/H]
251-255	F5.2	[Sun]	[CrI/H]c	Abundance [CrI/H] after correction for effective temperature trend (2)
257	I1	---	o_[CrI/H]	Number of CrI lines used
259-263	F5.2	[Sun]	[CrII/H]	? Abundance [CrII/H] (Z=24.1) (G1) (1)
265-268	F4.2	[Sun]	e_[CrII/H]	? rms uncertainty of [CrII/H]
270-273	F4.2	[Sun]	s_[CrII/H]	? Total error of [CrII/H]
275-279	F5.2	[Sun]	[CrII/H]c	? Abundance [CrII/H] after correction for effective temperature trend (2)
281	I1	---	o_[CrII/H]	? Number of CrII lines used
283-287	F5.2	[Sun]	[Mn/H]	Abundance [Mn/H] (Z=25) (G1) (1)
289-292	F4.2	[Sun]	e_[Mn/H]	rms uncertainty of [Mn/H]
294-297	F4.2	[Sun]	s_[Mn/H]	Total error of [Mn/H]
299	I1	---	o_[Mn/H]	Number of MnI lines used
301-305	F5.2	[Sun]	[Co/H]	Abundance [Co/H] (Z=27) (G1)
307-310	F4.2	[Sun]	e_[Co/H]	rms uncertainty of [Co/H]
312-315	F4.2	[Sun]	s_[Co/H]	Total error of [Co/H]
317-321	F5.2	[Sun]	[Co/H]c	Abundance [Co/H] after correction for effective temperature trend (2)
323	I1	---	o_[Co/H]	Number of CoI lines used
325-329	F5.2	[Sun]	[Ni/H]	Abundance [Ni/H] (Z=28) (G1)
331-334	F4.2	[Sun]	e_[Ni/H]	rms uncertainty of [Ni/H]
336-339	F4.2	[Sun]	s_[Ni/H]	Total error of [Ni/H]
341-345	F5.2	[Sun]	[Ni/H]c	Abundance [Ni/H] after correction for effective temperature trend (2)
347-348	I2	---	o_[Ni/H]	Number of NiI lines used

Note (1): When only one line was used to derive the abundances, 0.1dex rms is considered.

Note (2): Abundances for the elements after correction for the systematic trends with effective temperature.

Byte-by-byte Description of file: [ab_best.dat](#)

Bytes	Format	Units	Label	Explanations
1- 8	A8	---	Star	Star's identifier
10- 14	F5.2	[Sun]	[Mg/H]	Abundance [Mg/H] (Z=12) (G1)
16- 20	F5.2	[Sun]	[Al/H]	? Abundance [Al/H] (Z=13) (G1)
22- 26	F5.2	[Sun]	[Si/H]	Abundance [Si/H] (Z=14) (G1)
28- 32	F5.2	[Sun]	[Ca/H]	Abundance [Ca/H] (Z=20) (G1)

34- 38	F5.2	[Sun]	[ScI/H]	Abundance [ScI/H] (Z=21.0) (G1)
40- 44	F5.2	[Sun]	[ScII/H]	Abundance [ScII/H] (Z=21.1) (G1)
46- 50	F5.2	[Sun]	[TiI/H]	Abundance [TiI/H] (Z=22.0) (G1)
52- 56	F5.2	[Sun]	[TiII/H]	Abundance [TiII/H] (Z=22.0) (G1)
58- 62	F5.2	[Sun]	[V/H]	Abundance [V/H] (Z=23) (G1)
64- 68	F5.2	[Sun]	[CrI/H]	Abundance [CrI/H] (Z=24.0) (G1)
70- 74	F5.2	[Sun]	[Co/H]	Abundance [Co/H] (Z=27) (G1)
76- 80	F5.2	[Sun]	[Ni/H]	Abundance [Ni/H] (Z=28) (G1)

Byte-by-byte Description of file: [vel.dat](#)

Bytes	Format	Units	Label	Explanations
1- 8	A8	---	Star	Star's identifier
10- 13	I4	km/s	Ulsr	U velocity of the star relative to the LSR (1)
15- 18	I4	km/s	Vlsr	V velocity of the star relative to the LSR (1)
20- 23	I4	km/s	Wlsr	W velocity of the star relative to the LSR (1)
25- 28	F4.2	---	pD1	[0/1] Probability of a star belonging to the thick disc according to B03 (2)
30- 33	F4.2	---	ptD1	[0/1] Probability of a star belonging to the thin disc according to B03 (2)
35- 38	F4.2	---	pH1	[0/1] Probability of a star belonging to the halo according to B03 (2)
40- 44	A5	---	pop1	probable population where the star belongs according to B03 (thin, thick or trans)
46- 49	F4.2	---	pD2	[0/1] Probability of a star belonging to the thick disc according to R03 (3)
51- 54	F4.2	---	ptD2	[0/1] Probability of a star belonging to the thin disc according to R03 (3)
56- 59	F4.2	---	pH2	[0/1] Probability of a star belonging to the halo according to R03 (3)
61- 65	A5	---	pop2	probable population where the star belongs according to R03 (thin, thick or trans)

Note (1): The Galactic space velocities were calculated using the procedure from Johnson & Soderblom ([1987AJ....93..864J](#)) and corrected for the solar motion relative to the Local Standard of Rest (LSR) using $(U', V', W') = (+11.1, +12.24, +7.25)$ km/s from Schonrich et al. ([2010MNRAS.403.1829S](#)).

Note (2): The mean values (asymmetric drift) and dispersion in the Gaussian distribution (characteristic velocity dispersion), and the population fractions were taken from Bensby et al. ([2003A&A...410..527B](#)).

Note (3): The mean values (asymmetric drift) and dispersion in the Gaussian distribution (characteristic velocity dispersion), and the population fractions were taken from Robin et al. ([2003A&A...409..523R](#)).

Byte-by-byte Description of file: [ew.dat](#)

Bytes	Format	Units	Label	Explanations
1- 8	A8	-----	Star	Star's identifier
10- 16	F7.2	0.1nm	lambda	Central wavelength
18- 22	F5.1	0.1pm	EW	Equivalent width of the line

Byte-by-byte Description of file: [linelist.dat](#)

Bytes	Format	Units	Label	Explanations
1- 3	A3	---	El	Element and ionization state
5- 11	F7.2	0.1nm	lambda	[4792/6773] Central wavelength
13- 16	F4.2	eV	EP	Excitation potential
18- 23	F6.3	[-]	loggf	Oscillator strength
25- 28	F4.1	[-]	Dab	[-3.9/10.8] Difference in abundances between dwarfs and giants relative to σ (1)

Note (1): Negative value means that the abundances for giant stars are lower than for dwarfs. Values are relative to the dispersion ($N \cdot \sigma$)

Global notes:

Note (G1): Solar abundances for the selected elements:

Na I : $\log(\epsilon_0) = 6.33$
Mg I : $\log(\epsilon_0) = 7.58$
Al I : $\log(\epsilon_0) = 6.47$
Si I : $\log(\epsilon_0) = 7.55$
Ca I : $\log(\epsilon_0) = 6.36$
Sc I : $\log(\epsilon_0) = 3.10$
Sc II : $\log(\epsilon_0) = 3.10$
Ti I : $\log(\epsilon_0) = 4.99$
Ti II : $\log(\epsilon_0) = 4.99$

Mn I : $\log(\epsilon_0)=5.39$
Cr I : $\log(\epsilon_0)=5.67$
Cr II : $\log(\epsilon_0)=5.67$
V I : $\log(\epsilon_0)=4.00$
Co I : $\log(\epsilon_0)=4.92$
Ni I : $\log(\epsilon_0)=6.25$

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(End) Vardan Adibekyan [CAUP], Patricia Vannier [CDS] 31-Mar-2015

The document above follows the rules of the [Standard Description for Astronomical Catalogues](#); from this documentation it is possible to generate *f77* program to load files [into arrays](#) or [line by line](#)

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