

DSC#768

78-079A-05A

ISEE 3

SPHE-00311

HI-ENERGY COSMIC RAY COMP TABLES

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents To find associated documents you will need to know the document ID number and then click here.
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

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HI ENERGY COSMIC RAY COMP TABLES

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THIS DATA SET CONSISTS OF 1 MAGNETIC TAPE. THE TAPE IS 9-TRACK, 6250 BPI, CREATED ON A VAX COMPUTER, WRITTEN IN ASCII, WITH A LABEL NAME OF "ICE". A COPY OF THE FORMAT AND ACCOMPANYING DOCUMENT ARE INCLUDED ALSO. THE D AND C NUMBER ALONG WITH IT'S TIMESPAN IS LISTED BELOW.

D#	C#	FILES	TIMESPAN
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D-108354	C-032389	5	08/12/78-04/30/81

DATA WAS DOWNLOADED AND COPIED FROM ANON_DIR: [COHO.ISECHR]

12 April 1993

The accompanying ASCII files contain summaries of cosmic ray elemental and isotopic composition in the vicinity of Earth as measured by the high energy cosmic ray experiment on ISEE-3/ICE (NSSDC ID# 78-079A-05). These measurements refer to the time interval from August 1978 to April 1981 and to particle energies in the general range 50 to 500 MeV/nucleon.

The contents of the files are as follows:

TABLE1.TXT	Elemental Abundance Ratios
TABLE2.TXT	Isotopic Fractions
TABLE3.TXT	Isotopic Abundance Ratios

Each file also lists the references in which the measured values were published.

Questions concerning the contents of these files can be addressed to:

Mark E. Wiedenbeck
Mail Stop 169-327
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109

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PH: 818-354-7168
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ISEE-3/ICE HIGH ENERGY COSMIC RAY COMPOSITION TABLES

Data Set Coverage (yyyy-mm-dd): 1978-08-12 to 1991-04-30
Experiment: High Energy Cosmic Ray Experiment
Principal Investigator: Dr. Mark E. Wiedenbeck, NASA JPL
Data Set Contact: Dr. Mark E. Wiedenbeck, NASA JPL
Data Set Submission Date: 1993-04-12

Data Set Description:

The ASCII files in this data set contain tabular summaries of cosmic ray elemental and isotopic composition in interplanetary space at 1 A.U. near Earth as measured by the high energy cosmic ray experiment on ISEE-3/ICE. These measurements cover the time interval from August 1978 to April 1981 and particle nuclei energies in the general range of 50 to 500 MeV/nucleon. The contents of the files are as follows: elemental abundance Ratios in file TABLE1.TXT, isotopic fractions in TABLE2.TXT, and isotopic abundance ratios in TABLE3.TXT. Each file also lists the references in which the measured values were published. These data set files are also available in NSSDC's Coordinated Heliospheric Observations (COHO) data base in the Anonymous FTP site accessible via World Wide Web at http://nssdc.gsfc.nasa.gov/space_physics_home.html.

Data Set Files:

- ICRHCR.FMT - This format document (ASCII)
ICRHCR.DOC - Original document file (ASCII)
TABLE1.TXT - Elemental abundance ratios (ASCII)
TABLE2.TXT - Isotopic fractions (ASCII)
TABLE3.TXT - Isotopic abundance ratios (ASCII)

Parameter Format for Files TABLEn.TXT: Simple ASCII tables

NSSDC Data Set ID: 78-079A-05A

NSSDC Data Set Location:

Off-line: ask for NSSDC data set 78-079A-05A from request@nssdca.gsfc.nasa.gov

On-line: COHO directory at nssdca::anon_dir:[coho.icehcr]

Acknowledgement:

Please acknowledge the National Space Science Data Center and the Principal Investigator, Dr. Mark E. Wiedenbeck of NASA's Jet Propulsion Laboratory, for use of this data in publications.

Related Information:

Other information about the ISEE-3/ICE mission, experiments, and data sets at

NSSDC may be obtained via World Wide Web and NSSDC's space physics page at http://nssdc.gsfc.nasa.gov/space/space_physics_home.html. Non-WWW users may access NSSDC information in the NASA Master Directory and the NSSDC Master catalog via Internet login to the NSSDC On-Line Data Information Service (NODIS) at nodis@nssdca.gsfc.nasa.gov.

Other ISEE-3 data on NDADS (NASA's Data Archive and Distribution Service) may be located via WWW or an e-mail message to ARMS (Automated Retrieval Mail System) at archives@ndadsa.gsfc.nasa.gov with "HOLDINGS" on the subject line.

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12 April 1993

Dr. Joseph H. King, Head
National Space Science Data Center
Code 633.0
NASA / Goddard Space Flight Center
Greenbelt, MD 20771

Dear Dr. King:

Enclosed is my submission to the NSSDC of a summary of cosmic ray elemental and isotopic composition in the vicinity of Earth as measured by the high energy cosmic ray experiment on ISEE-3/ICE (NSSDC ID# 78-079A-05). These measurements refer to the time interval from August 1978 to April 1981 and to particle energies in the general range ~ 50 to ~ 500 MeV/nucleon. A figure is enclosed which shows the energy interval over which each element was measured.

The data consist of a set of three tables:

- Table 1 Elemental Abundance Ratios
- Table 2 Isotopic Fractions
- Table 3 Isotopic Abundance Ratios

These tables are provided in two forms, on paper and as ASCII text files on an IBM-PC $5\frac{1}{4}$ inch floppy disk.

Sincerely,

A handwritten signature in black ink that reads "Mark E. Wiedenbeck".

Mark E. Wiedenbeck

encl.

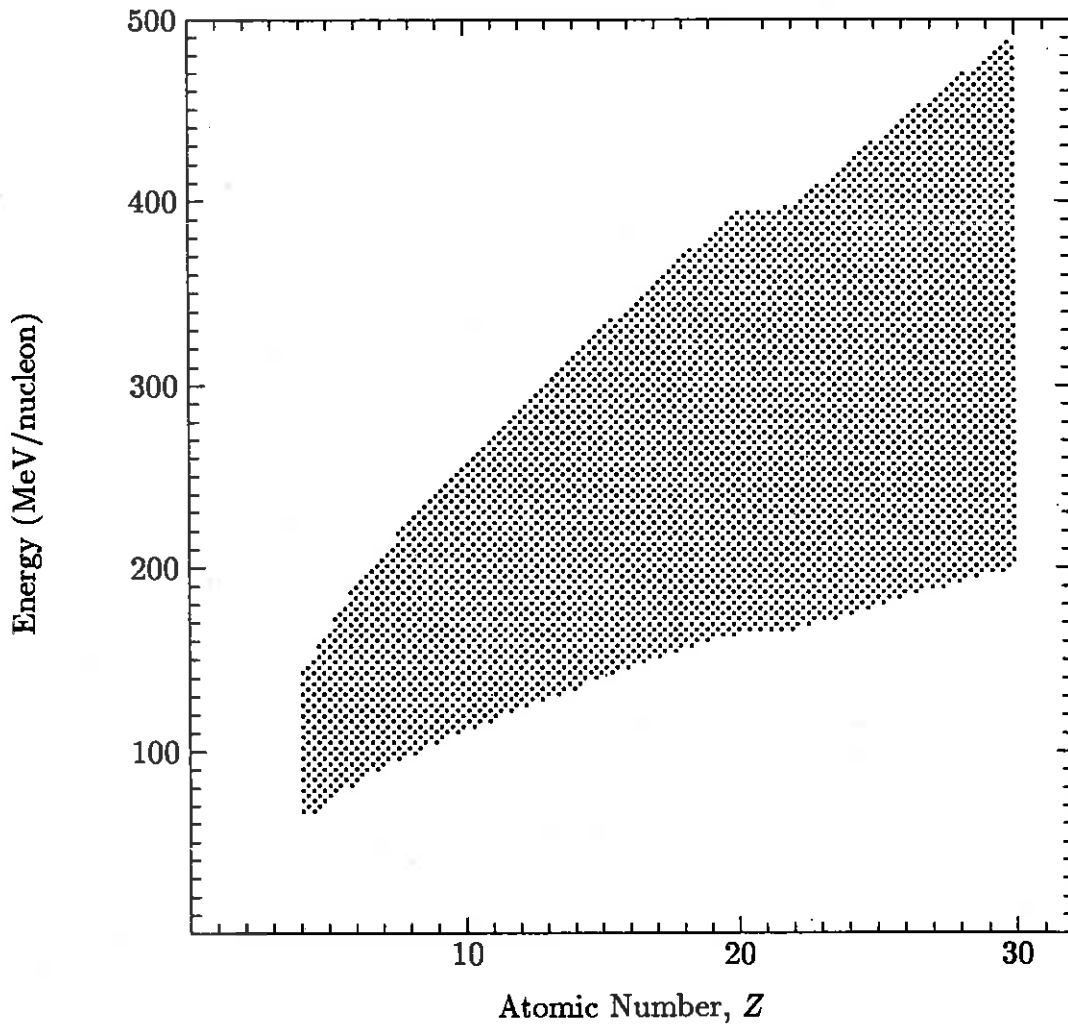


Figure 1

Shaded area shows the approximate energy intervals used for composition measurements as a function of the atomic number of the measured element.

Table 1
Elemental Abundance Ratios Measured with the
High Energy Cosmic Ray Experiment on ISEE-3

Ratio	Measured Value	Ref.
B/C	0.261 ±0.009	<i>a</i>
C/O	0.976 ±0.034	<i>a</i>
N/O	0.251 ±0.006	<i>a</i>
F/Si	0.118 ±0.010	<i>b</i>
Ne/Si	0.982 ±0.051	<i>b</i>
Na/Si	0.189 ±0.011	<i>b</i>
Mg/Si	1.330 ±0.040	<i>b</i>
Al/Si	0.211 ±0.009	<i>b</i>
P/Si	0.037 ±0.003	<i>b</i>
S/Si	0.176 ±0.008	<i>b</i>
Cl/Si	0.036 ±0.003	<i>b</i>
Ar/Si	0.073 ±0.005	<i>b</i>
K/Si	0.064 ±0.005	<i>b</i>
Ca/Si	0.154 ±0.009	<i>b</i>
Fe/Si	0.719 ±0.054	<i>b</i>
Sc/Fe	0.0487 (+0.0044, -0.0037)	<i>c</i>
Ti/Fe	0.1630 (+0.0084, -0.0077)	<i>c</i>
V/Fe	0.0787 (+0.0053, -0.0047)	<i>c</i>
Cr/Fe	0.1527 (+0.0074, -0.0067)	<i>c</i>
Mn/Fe	0.0938 (+0.0056, -0.0050)	<i>c</i>
Co/Fe	0.0085 (+0.0018, -0.0013)	<i>c</i>
Co/Fe	0.0085 (+0.0018, -0.0013)	<i>c</i>
Ni/Fe	0.0482 (+0.0039, -0.0033)	<i>c</i>
Cu/Fe	< 0.00083	<i>c</i>
Zn/Fe	0.00074 (+0.00072, -0.00022)	<i>c</i>

References

- a* "The Isotopic Composition of Cosmic Ray Boron and Nitrogen", K. E. Krombel and M. E. Wiedenbeck, *Ap. J.*, **328**, 940 (1988).
- b* "Composition Measurements from ISEE-3: Fluorine through Calcium", R. A. Leske and M. E. Wiedenbeck, *Proc. 23rd Internat. Cosmic Ray Conf.* (Calgary), submitted 1993.
- c* "The Elemental and Isotopic Composition of Galactic Cosmic-Ray Nuclei from Scandium through Nickel", R. A. Leske, *Ap. J.*, **405**, 567 (1993).

Table 2
Isotopic Fractions Measured with the
High Energy Cosmic Ray Experiment on ISEE-3

Ratio	Measured Value	Ref.	Ratio	Measured Value	Ref.
$^7\text{Be}/\text{Be}$	0.546 ± 0.029	<i>a</i>	$^{44}\text{Ti}/\text{Ti}$	$0.015 (+0.013, -0.008)$	<i>d</i>
$^9\text{Be}/\text{Be}$	0.390 ± 0.029	<i>a</i>	$^{46}\text{Ti}/\text{Ti}$	$0.240 (+0.040, -0.039)$	<i>d</i>
$^{10}\text{Be}/\text{Be}$	0.064 ± 0.015	<i>a</i>	$^{47}\text{Ti}/\text{Ti}$	$0.273 (+0.054, -0.057)$	<i>d</i>
$^{10}\text{B}/\text{B}$	$0.283 (+0.011, -0.008)$	<i>b</i>	$^{48}\text{Ti}/\text{Ti}$	$0.376 (+0.061, -0.054)$	<i>d</i>
$^{11}\text{B}/\text{B}$	$0.717 (+0.008, -0.011)$	<i>b</i>	$^{49}\text{Ti}/\text{Ti}$	< 0.066	<i>d</i>
$^{14}\text{N}/\text{N}$	$0.447 (+0.011, -0.010)$	<i>b</i>	$^{50}\text{Ti}/\text{Ti}$	$0.063 (+0.026, -0.021)$	<i>d</i>
$^{15}\text{N}/\text{N}$	$0.553 (+0.010, -0.011)$	<i>b</i>	$^{49}\text{V}/\text{V}$	$0.391 (+0.074, -0.073)$	<i>d</i>
$^{32}\text{S}/\text{S}$	0.65 ± 0.04	<i>c</i>	$^{50}\text{V}/\text{V}$	$0.359 (+0.092, -0.088)$	<i>d</i>
$^{33}\text{S}/\text{S}$	0.13 ± 0.03	<i>c</i>	$^{51}\text{V}/\text{V}$	$0.250 (+0.073, -0.066)$	<i>d</i>
$^{34}\text{S}/\text{S}$	0.21 ± 0.03	<i>c</i>	$^{50}\text{Cr}/\text{Cr}$	$0.206 (+0.053, -0.042)$	<i>d</i>
$^{36}\text{S}/\text{S}$	< 0.02	<i>c</i>	$^{51}\text{Cr}/\text{Cr}$	$0.218 (+0.057, -0.056)$	<i>d</i>
$^{35}\text{Cl}/\text{Cl}$	0.60 ± 0.07	<i>c</i>	$^{52}\text{Cr}/\text{Cr}$	0.458 ± 0.055	<i>d</i>
$^{36}\text{Cl}/\text{Cl}$	0.13 ± 0.07	<i>c</i>	$^{53}\text{Cr}/\text{Cr}$	$0.089 (+0.040, -0.036)$	<i>d</i>
$^{37}\text{Cl}/\text{Cl}$	0.27 ± 0.07	<i>c</i>	$^{54}\text{Cr}/\text{Cr}$	< 0.052	<i>d</i>
$^{36}\text{Ar}/\text{Ar}$	0.36 ± 0.06	<i>c</i>	$^{53}\text{Mn}/\text{Mn}$	0.421 ± 0.057	<i>d</i>
$^{37}\text{Ar}/\text{Ar}$	0.23 ± 0.06	<i>c</i>	$^{54}\text{Mn}/\text{Mn}$	< 0.095	<i>d</i>
$^{38}\text{Ar}/\text{Ar}$	0.37 ± 0.06	<i>c</i>	$^{55}\text{Mn}/\text{Mn}$	$0.538 (+0.058, -0.059)$	<i>d</i>
$^{40}\text{Ar}/\text{Ar}$	$0.034 (+0.024, -0.017)$	<i>c</i>	$^{54}\text{Fe}/\text{Fe}$	$0.069 (+0.013, -0.012)$	<i>d</i>
$^{39}\text{K}/\text{K}$	0.48 ± 0.06	<i>c</i>	$^{55}\text{Fe}/\text{Fe}$	< 0.063	<i>d</i>
$^{40}\text{K}/\text{K}$	0.25 ± 0.07	<i>c</i>	$^{56}\text{Fe}/\text{Fe}$	$0.815 (+0.024, -0.025)$	<i>d</i>
$^{41}\text{K}/\text{K}$	0.27 ± 0.06	<i>c</i>	$^{57}\text{Fe}/\text{Fe}$	< 0.071	<i>d</i>
$^{40}\text{Ca}/\text{Ca}$	0.27 ± 0.04	<i>c</i>	$^{58}\text{Fe}/\text{Fe}$	< 0.029	<i>d</i>
$^{41}\text{Ca}/\text{Ca}$	0.12 ± 0.03	<i>c</i>	$^{57}\text{Co}/\text{Co}$	$0.32 (+0.25, -0.14)$	<i>d</i>
$^{42}\text{Ca}/\text{Ca}$	0.14 ± 0.03	<i>c</i>	$^{59}\text{Co}/\text{Co}$	$0.68 (+0.14, -0.26)$	<i>d</i>
$^{43}\text{Ca}/\text{Ca}$	0.23 ± 0.04	<i>c</i>	$^{58}\text{Ni}/\text{Ni}$	$0.408 (+0.095, -0.092)$	<i>d</i>
$^{44}\text{Ca}/\text{Ca}$	0.24 ± 0.04	<i>c</i>	$^{59}\text{Ni}/\text{Ni}$	< 0.20	<i>d</i>
$^{46}\text{Ca}/\text{Ca}$	< 0.012	<i>c</i>	$^{60}\text{Ni}/\text{Ni}$	$0.447 (+0.118, -0.115)$	<i>d</i>
			$^{61}\text{Ni}/\text{Ni}$	< 0.073	<i>d</i>
			$^{62}\text{Ni}/\text{Ni}$	< 0.10	<i>d</i>

References

- a* "A Cosmic-Ray Age Based on the Abundance of ^{10}Be ", M. E. Wiedenbeck and D. E. Greiner, *Ap. J. (Letters)*, **239**, L139 (1980).
- b* "The Isotopic Composition of Cosmic Ray Boron and Nitrogen", K. E. Krombel and M. E. Wiedenbeck, *Ap. J.*, **328**, 940 (1988).
- c* "Composition Measurements from ISEE-3: Fluorine through Calcium", R. A. Leske and M. E. Wiedenbeck, *Proc. 23rd Internat. Cosmic Ray Conf.* (Calgary), submitted 1993.
- d* "The Elemental and Isotopic Composition of Galactic Cosmic-Ray Nuclei from Scandium through Nickel", R. A. Leske, *Ap. J.*, **405**, 567 (1993).

Table 3
Isotopic Abundance Ratios Measured with the
High Energy Cosmic Ray Experiment on ISEE-3

Ratio	Measured Value	Ref.
$^{13}\text{C}/^{12}\text{C}$	0.070 ± 0.006	<i>a</i>
$^{17}\text{O}/^{16}\text{O}$	$0.019 (+0.004, -0.003)$	<i>b</i>
$^{18}\text{O}/^{16}\text{O}$	0.019 ± 0.002	<i>b</i>
$^{21}\text{Ne}/^{20}\text{Ne}$	$0.25 (+0.05, -0.04)$	<i>b</i>
$^{22}\text{Ne}/^{20}\text{Ne}$	$0.67 (+0.10, -0.07)$	<i>b</i>
$^{25}\text{Mg}/^{24}\text{Mg}$	$0.28 (+0.04, -0.03)$	<i>b</i>
$^{26}\text{Mg}/^{24}\text{Mg}$	$0.30 (+0.04, -0.03)$	<i>b</i>
$^{26}\text{Al}/^{27}\text{Al}$	$0.036 (+0.037, -0.022)$	<i>c</i>
$^{29}\text{Si}/^{28}\text{Si}$	$0.109 (+0.024, -0.014)$	<i>a</i>
$^{30}\text{Si}/^{28}\text{Si}$	$0.084 (+0.020, -0.014)$	<i>a</i>
$^{44}\text{Ti}/^{48}\text{Ti}$	$0.041 (+0.036, -0.023)$	<i>d</i>
$^{46}\text{Ti}/^{48}\text{Ti}$	$0.64 (+0.17, -0.16)$	<i>d</i>
$^{47}\text{Ti}/^{48}\text{Ti}$	$0.73 (+0.26, -0.23)$	<i>d</i>
$^{49}\text{Ti}/^{48}\text{Ti}$	< 0.19	<i>d</i>
$^{50}\text{Ti}/^{48}\text{Ti}$	$0.168 (+0.076, -0.059)$	<i>d</i>
$^{49}\text{V}/^{50}\text{V}$	$1.09 (+0.48, -0.34)$	<i>d</i>
$^{51}\text{V}/^{50}\text{V}$	$0.70 (+0.42, -0.27)$	<i>d</i>
$^{50}\text{Cr}/^{52}\text{Cr}$	$0.45 (+0.14, -0.11)$	<i>d</i>
$^{51}\text{Cr}/^{52}\text{Cr}$	$0.48 (+0.18, -0.15)$	<i>d</i>
$^{53}\text{Cr}/^{52}\text{Cr}$	$0.194 (+0.108, -0.084)$	<i>d</i>
$^{54}\text{Cr}/^{52}\text{Cr}$	< 0.12	<i>d</i>
$^{54}\text{Mn}/^{53}\text{Mn}$	< 0.25	<i>d</i>
$^{55}\text{Mn}/^{53}\text{Mn}$	$1.28 (+0.32, -0.25)$	<i>d</i>
$^{54}\text{Fe}/^{56}\text{Fe}$	$0.084 (+0.017, -0.015)$	<i>d</i>
$^{55}\text{Fe}/^{56}\text{Fe}$	< 0.078	<i>d</i>
$^{57}\text{Fe}/^{56}\text{Fe}$	< 0.089	<i>d</i>
$^{58}\text{Fe}/^{56}\text{Fe}$	< 0.036	<i>d</i>
$^{59}\text{Co}/^{57}\text{Co}$	$2.2 (+2.1, -1.4)$	<i>d</i>
$^{59}\text{Ni}/^{58}\text{Ni}$	< 0.58	<i>d</i>
$^{60}\text{Ni}/^{58}\text{Ni}$	$1.10 (+0.50, -0.35)$	<i>d</i>
$^{61}\text{Ni}/^{58}\text{Ni}$	< 0.19	<i>d</i>
$^{62}\text{Ni}/^{58}\text{Ni}$	< 0.28	<i>d</i>

References

- a* "High Resolution Observations of the Isotopic Composition of Carbon and Silicon in the Galactic Cosmic Rays", M. E. Wiedenbeck and D. E. Greiner, *Ap. J. (Letters)*, **247**, L119 (1981).
- b* "Isotopic Anomalies in the Galactic Cosmic-Ray Source", M. E. Wiedenbeck and D. E. Greiner, *Phys. Rev. Letters*, **46**, 682 (1981).
- c* "The Abundance of the Radioactive Isotope ^{26}Al in Galactic Cosmic Rays", M. E. Wiedenbeck, *Proc. 18th Internat. Cosmic Ray Conf.* (Bangalore), **9**, 147 (1983).
- d* "The Elemental and Isotopic Composition of Galactic Cosmic-Ray Nuclei from Scandium through Nickel", R. A. Leske, *Ap. J.*, **405**, 567 (1993).