

Comparison between AAS and IC cations concentrations for the WRT 2015

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Methods

- Atomic absorption spectrophotometry, AAS700, in function since 2004, new lamps, flame air/acetylene, standards prepared from standard reference metal solution containing 1000 ppm, from Merck
- Ion chromatography, ICS3000, simultaneous cations - anions analysis, in function since 2009, loop 200 μ l, eluent 20mM methanesulphonic acid, 1000 μ l/min

Values of sodium concentrations measured by AAS and IC

Sample	Method	Na concentrations (mg/l)						Mean	Lab median	Tend
1	AAS	2,341	2,4	2,444	2,205	2,178	2,212	2,297	2,470	<
	IC	2,476	2,551	2,19	2,57	2,57	2,56	2,486		=
2	AAS	5,246	5,225	5,159	5,113	5,104	5,157	5,167	5,280	<
	IC	5,567	5,653	5,106	5,523	5,561	5,57	5,497		>
3	AAS	0,663	0,662	0,605	0,631	0,592	0,617	0,628	0,733	<
	IC	0,661	0,757	0,577	0,752	0,75	0,747	0,707		<
4	AAS	2,305	2,335	2,216	2,366	2,148	2,29	2,277	2,371	<
	IC	2,356	2,397	2,421	2,428	2,431	2,413	2,408		>
5	AAS	3,837	3,865	3,873	3,849	3,971	3,846	3,874	3,976	<
	IC	4,102	4,13	3,996	4,096	4,147	3,975	4,074		>

Values of potassium concentrations measured by AAS and IC

Sample nr	Method	K concentrations (mg/l)						Mean	Lab median	Tend
1	AAS	1,580	1,56	1,465	1,556	1,454	1,529	1,524	1,610	<
	IC	1,400	1,481	1,361	1,469	1,487		1,440		<
2	AAS	2,062	2,008	1,937	1,938	1,944	1,990	1,980	2,071	<
	IC	1,998	2,056	2,029	2,019	1,999	1,955	2,009		<
3	AAS	0,620	0,600	0,498	0,501	0,48	0,578	0,546	0,666	<
	IC	0,361	0,37	0,495	0,547	0,574	0,547	0,482		<
4	AAS	3,766	3,672	3,882	3,778	3,748	3,692	3,756	3,86	<
	IC	3,825	3,43	3,73	3,676	3,676	3,611	3,658		<
5	AAS	1,427	1,415	1,422	1,444	1,405	1,43	1,424	1,460	<
	IC	1,211	1,176	1,239	1,242	1,243	1,311	1,237		<

Values of magnesium concentrations measured by AAS and IC

Sample nr	Method	Mg concentrations (mg/l)	Mean	Lab median	Tend
1	AAS	0,501 0,494 0,499 0,498 0,496 0,5	0,498	0,49	=
	IC	0,529 0,546 0,442 0,57 0,57 0,58	0,540		>
2	AAS	0,567 0,566 0,562 0,562 0,56 0,565	0,564	0,555	=
	IC	0,616 0,632 0,569 0,65 0,655 0,62	0,624		>
3	AAS	0,069 0,067 0,067 0,067 0,068 0,069	0,068	0,071	<
	IC	0,04 0,073 0,016 0,103 0,076 0,083	0,065		<
4	AAS	0,723 0,714 0,724 0,724 0,721 0,722	0,721	0,72	=
	IC	0,758 0,782 0,687 0,756 0,795 0,745	0,754		>
5	AAS	1,072 1,071 1,076 1,067 1,07 1,074	1,072	1,073	=
	IC	1,142 1,164 1,045 1,2 1,195 1,197	1,157		>

Values of calcium concentrations measured by AAS and IC

Sample nr	Method	Ca concentrations (mg/l)						Mean	Lab median	Tend
1	AAS	2,085	2,061	2,062	2,049	2,085	2,078	2,070	2,5	<
	IC	2,468	2,722	2,106	2,83	2,86	2,75	2,623		>
2	AAS	0,954	0,926	1,018	1,04	1,035	1,039	1,002	1,050	<
	IC	1,276	1,423	1,122	1,256	1,2	1,306	1,264		>
3	AAS	0,133	0,145	0,162	0,141	0,115	0,127	0,137	0,191	<
	IC	0,101	0,062	0,062	0,033	0,021	0,04	0,053		<
4	AAS	1,732	1,732	1,795	1,777	1,8	1,798	1,772	2,420	<
	IC	2,199	2,567	2,502	2,6	2,643	2,402	2,486		>
5	AAS	1,795	1,691	1,842	1,806	1,833	1,886	1,809	3,240	<
	IC	3,137	3,395	3,674	3,594	3,596	3,45	3,474		>

Conclusions

- Na: AAS mean values are lower than the IC mean values for all the 5 samples and lower than lab median, but are in the range $\pm 15\%$. IC are equal or higher than lab median (excepted sample 3), but better approximate the lab median
- K: AAS mean values are higher than IC mean values or equal (sample 3), but are lower than lab median and approximate them better than IC

- Mg: AAS mean values are lower than IC mean values, but very close to the lab median. IC mean values higher than lab median, but in the range $\pm 15\%$
- Ca: AAS mean values lower than IC, excepted sample 3. IC better approximate the lab median for concentrations higher than 1.5 and AAS for lower concentrations.