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赣南兴国和宁都脱贫攻坚 1∶50 000 水文地质调查数据集

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摘要：赣南兴国和宁都脱贫攻坚 1∶50 000 水文地质调查数据集依托于自然资源部中国地质调查局统一部署的赣南扶贫找水项目，反映了解决山区群众饮水困难以及为地方政府发展矿泉水等绿色水产业过程中取得的调查成果。本数据集包含“长江中游城市群咸宁−岳阳和南昌−怀化段高铁沿线 1∶50 000 环境地质调查（水环中心）”项目于 2017 年 1 月—9 月在工程施工过程中取得的钻孔基础数据（7 个钻孔）、钻孔地层描述信息（7 个钻孔）、矿泉水普查成果（21 个调查点）、矿泉水分析结果（15 件）、饮用水分析结果（4 件）等五组数据。其中钻孔基础数据和地层描述信息主要包括钻孔位置信息、孔径、孔深、钻孔单井涌水量、钻孔取样情况、钻孔揭露地层时代和层底深度（m），以及地层岩性描述等信息；矿泉水普查成果数据主要包括调查点位置信息、调查点现场测试指标、成因分析等；矿泉水分析结果和饮用水分析结果是工程施工过程中所取水样的实验室测试结果。勘查施工完成的钻孔，直接解决了 3 000 人的饮水困难；发现的优质矿泉水为支撑地方经济发展开拓了新的思路。

关键词：赣南地区；脱贫攻坚；水文地质调查；饮用水；地下水数据集
数据服务系统网址：http://dcc.cgs.gov.cn

1 引言

赣南兴国和宁都脱贫攻坚 1∶50 000 水文地质调查数据集是以项目实施过程中可公开发布的信息为基础，整理编制形成，旨在为赣南兴国县和宁都县脱贫攻坚提供支撑服务。获取本数据集的工作区位于赣州市北部的兴国县和宁都县，该区地貌以中低山、丘

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陵为主，为江西省的山区县，属亚热带季风湿润气候。兴国县和宁都县年降水量多在1 500～1 700 mm，区内河流主要属赣江贡水支流的平固江水系和梅江水系。工作区处于南岭东西向构造带的北东端和武夷山隆起带交接复合地区，经历多期次构造活动。区内发育的兴国、宁都、赖村等多个盆地，主要分布一套白垩系陆相红色岩系，属洪积、湖积、河流相沉积，是在炎热干燥气候条件下形成的类磨拉石构造，构成砾岩-砂岩-砾岩的沉积旋回，相变较显著。发育的青塘盆地、梅窖盆地等盆地主要发育石炭系。盆地周边被震旦系、寒武系变质岩和加里东期、燕山期花岗岩环绕，松散岩类分布范围狭小且零星。地下水以大气降水补给为主，水循环以浅循环为主，多以泉或散流形式排出地表，但受地质构造、地层岩性和地形地貌影响，区内含水岩组富水性普遍较差，水质类型以重碳酸型低矿化淡水为主。

赣南兴国和宁都脱贫攻坚水文地质调查数据集基本信息简表见表1。

表1　数据库（集）元数据简表

条目	描述
数据库（集）名称	赣南兴国和宁都脱贫攻坚1：50 000水文地质调查数据集
数据库（集）作者	龚　磊，中国地质调查局水文地质环境地质调查中心 王新峰，中国地质调查局水文地质环境地质调查中心 宋　绵，中国地质调查局水文地质环境地质调查中心 李红燕，中国地质调查局水文地质环境地质调查中心 肖则佑，江西省地质矿产勘查开发局赣南地质调查大队 胡啟锋，江西有色地质勘查二队 王　进，江西省地质矿产勘查开发局赣南地质调查大队 吴琳伟，江西有色地质勘查二队 王　磊，江西有色地质勘查二队 缪　赛，江西有色地质勘查二队
数据时间范围	2017.1—2017.9
地理区域	江西省赣州市兴国县、宁都县
数据格式	*.xlsx
数据量	69.90 KB
数据服务系统网址	http://dcc.cgs.gov.cn
基金项目	中国地质调查局地质调查项目(DD20179262)和国家自然科学基金项目(41330314)联合资助
语种	中文
数据库（集）组成	钻孔基本信息表.xlsx、钻孔地层描述表.xlsx、矿泉水点普查调查表.xlsx、矿泉水分析测试结果表.xlsx、饮用水分析测试结果表.xlsx

2　数据采集和处理方法

2.1　钻孔数据采集

本次工作过程中，所实施钻孔均依据《DZ/T 0282-2015 水文地质调查规范（1：50 000）》、《DZ/T 0148-2014 水文水井地质钻探规程》相关要求进行了数据记录，依据支撑地方政府脱贫攻坚需求，本数据集对钻孔重要信息进行了整理集成，形成地质钻孔基本信息表和钻孔地层描述表。

钻孔涌水量采用三角堰箱和超声波流量计进行双重校核确定，钻孔水位埋深采用水位尺（型号 In-Situ Water Level Meter 200）进行测量。

在钻孔抽水试验接近结束时采取水样，送实验室检测。其中在 XGZK01、XGZK02、XGZK05、XGZK06 四个钻孔中采集水样进行矿泉水分析，在 XGZK01、XGZK02、XGZK03、XGZK04 四个钻孔中采集水样进行饮用水分析。

2.2 矿泉水调查数据采集

2017 年 8 月 4 日至 8 月 6 日，在宁都县小布镇开展了矿泉水调查，主要对泉水出露点处的水文地质条件、泉流量进行调查，并对泉水进行现场指标测试。泉流量测量方法包括统计法、容积法、三角堰法；现场指标测试采用 INSITU-SmartTroll 多参数检测仪对 pH、电导率、溶解氧（*DO*）、E_h 等进行检测，采用偏硅酸检测盒，对偏硅酸进行检测。选取现场偏硅酸测试值在 25 ~ 50 mg/L 及以上的调查点，采集矿泉水分析样送实验室进行检测。

2.3 水样采集与数据处理

本次工作中根据《HJ 493−2009 水质采样样品的保存和管理技术规定》、《HJ 494−2009 水质采样技术指导》、《GB/T 5750.2−2006 生活饮用水标准检验方法 水样的采集和保存》制定采样技术要求，并进行水样采集、保存和送样。本数据包含矿泉水分析水样结果 15 个，饮用水分析水样结果 4 个。

矿泉水分析检测指标依据《GB 8537−2008 饮用天然矿泉水》并结合项目工作实际确定，本次数据整理时选取了饮用天然矿泉水规范中水质界限指标和限量指标，并参照地下水质量标准，共计 51 项。

饮用水分析检测指标依据《GB 5749−2006 生活饮用水卫生标准》并结合项目工作实际确定，本次数据整理时选取整理了 33 项。

所有数据未经处理，皆为实验室测试结果筛选。

3 数据内容描述

赣南兴国和宁都脱贫攻坚水文地质调查数据集为 Excel 表格型数据，包括 5 个 Excel 数据文件，分别为“钻孔基本信息表.xlsx”、“钻孔地层描述表.xlsx”、“矿泉水点普查调查表.xlsx”、“矿泉水分析测试结果表.xlsx”和“饮用水分析测试结果表.xlsx”。

“钻孔基本信息表.xlsx”数据文件（表 2），描述本次工作中施工的 7 眼探采结合井的基本信息，每一个钻孔为一行，包含钻孔编号、地理位置、孔深、孔径、滤水管段、实管段、静水位埋深、钻孔单井开采量、取样情况（矿泉水分析、饮用水分析）等信息。

表 2 钻孔基本信息表

序号	数据项名称	数据类型	实例
1	钻孔编号	字符串	XGZK01
2	地理位置	字符串	江西省赣州市兴国县埠头乡西霞村
3	孔深	浮点型	156
4	孔径	浮点型	305
5	滤水管段	浮点型	147.0-111.0 m
6	实管段	浮点型	111.0-0 m

续表 2

序号	数据项名称	数据类型	实例
7	静水位埋深	浮点型	15.46
8	钻孔单井开采量	浮点型	432
9	取样情况	字符串	矿泉水分析、饮用水分析

“钻孔地层描述表.xlsx”数据文件（表 3），描述本次工作中施工的 7 眼探采结合井揭露地层的信息，主要包括钻孔编号、地层时代、地层代号、层底深度 (m)、岩土名称、岩土颜色、地层岩性描述等信息。

表 3　钻孔地层描述表

序号	数据项名称	数据类型	实例
1	钻孔编号	字符串	XGZK01
2	地层时代	字符串	第四系全新统
3	地层代号	字符串	Qh
4	层底深度	浮点型	3
5	岩土名称	字符串	粉质粘土
6	岩土颜色	字符串	红褐色
7	地层岩性描述	字符串	软–可塑，稍湿

“矿泉水点普查调查表.xlsx”数据文件（表 4），主要是描述本次工作中调查的矿泉水点基本信息，共计 21 个调查点，每一个调查点为一行，包含野外编号、地理位置、图幅编号、泉水类型、含水层岩性、主要用途、补给来源、流量测定方法、泉的流量、动态变化特征、泉水温度、色度、味、气味、透明度、pH 值、E_h、耗氧量（*DO*）、电导率、HCO_3^-、取样情况、备注、调查工作时间等信息。

表 4　矿泉水点普查调查表

序号	数据项名称	数据类型	实例
1	野外编号	字符串	SQ01
2	地理位置	字符串	江西省宁都县小布镇上潮村禾担丘小组
3	图幅编号	字符串	琳池幅G50E007008
4	泉水类型	字符串	上升泉
5	含水层 岩性	字符串	黑云母二长花岗岩(r25)
6	主要用途	字符串	5户人家饮用
7	补给来源	字符串	大气降水
8	流量测 定方法	字符串	容积法
9	泉的流量	浮点型	0.095
10	动态变 化特征	字符串	水量受季节，降雨较小，基本保持不定，枯平比90%
11	泉水温度	浮点型	19
12	色度	字符串	无
13	味	字符串	无
14	气味	字符串	无
15	透明度	字符串	透明

续表 4

序号	数据项名称	数据类型	实例
16	pH值	浮点型	6.58
17	E_h	浮点型	157
18	耗氧量（*DO*）	浮点型	3.36
19	电导率	浮点型	85.5
20	HCO_3^-	浮点型	59.34
21	取样情况	字符串	矿泉水全分析
22	备注	字符串	井：井径110 cm水位埋深49 cm，井深85 cm井壁结构堆砌石，建井2015年。偏硅酸含量25-50 mm/l
23	调查工作时间	时间型	2017/8/4

“矿泉水分析测试结果表.xlsx”数据文件（表略，参见数据集），共计 15 个样品，主要包括基本信息 5 项（送样编号、野外编号、取样日期、收样日期、完成日期）、感官性指标 4 项（色度、浑浊度、臭和味、肉眼可见物）、界限指标 8 项（Li、Sr、Zn、I、H_2SiO_3、Se、游离 CO_2、溶解性总固体）、限量指标 16 项 [Sb、As、Cu、Ba、Cd、总 Cr、Pb、Hg、Mn、Ni、Ag、溴酸盐、硼酸盐（B）、NO_3^-、F^-、耗氧量]、污染物指标 3 项（挥发酚类、氰化物、NO_2^-）、微生物指标 2 项（菌落总数、大肠菌群）、其他指标 20 项（pH、K^+、Na^+、Ca^+、Mg^+、Al^{3+}、NH_4^+、Cl^-、SO_4^{2-}、HCO_3^-、CO_3^{2-}、OH^-、可溶 SiO_2、总硬度、暂时硬度、永久硬度、负硬度、总碱度、总酸度、TFe）等信息。

“饮用水分析测试结果表.xlsx”数据文件（表略，参见数据集），共计 4 个样品，主要包括基本信息 5 项（送样编号、野外编号、取样日期、收样日期、完成日期）、微生物指标 1 项（大肠菌群）、毒理指标 9 项（As、Cd、总 Cr、Pb、Hg、Se、氰化物、F^-、NO_3^-）、一般化学指标 23 项（pH、K^+、Na^+、Ca^{2+}、Mg^{2+}、Al^{3+}、NH_4^+、Cl^-、SO_4^{2-}、HCO_3^-、CO_3^{2-}、Fe^{3+}、Mn、Cu、游离 CO_2、可溶 SiO_2、Ag、I、NO_2^-、PO_4^{3-}、溶解性总固体、耗氧量、挥发酚类）等信息。

4 数据质量控制

（1）勘探数据质量

水文地质钻孔数据的质量控制包括数据的检查整理、单点数据的核查，对获取的各项水文地质特征数据的过程均按照《DZ/T 0282−2015 水文地质调查规范（1：50 000）》、《DZ/T 0148−2014 水文水井地质钻探规程》等标准进行验收，确保数据的真实、准确。

（2）调查数据质量

矿泉水点普查数据的质量控制包括对数据填写的完整性、规范性、准确性进行检查，所有数据的整理包括人工填写检查和电子记录核查，并按照三级管理体系要求进行检查。

（3）水质样品测试数据质量

所采水样的测试工作均由国土资源部南昌矿产资源监督检测中心（江西省地质调查研究院）承担。

水质样品测试的准确度控制采用插入标准溶液样和加标回收两种方法进行。单个统计标准溶液样的测量值在其给定参考值的 2 倍不确定范围内为合格。加标回收率在

90% ~ 110% 范围内为合格。

水质样品测试的精密度控制采用重复测试的方法进行，每一批次水质样品随机抽取 20% 作为检查测试样，编成密码一同测试。按《DZ/T0130.6 −2006 地质矿产实验室测试质量管理规范 第 6 部分：水样分析》标准中水质测试相对偏差允许限（Y=11.0 C·$X^{-0.28}$）判断是否合格（马洪云等, 2018）。

每一批次样品，实验室均同时进行 2 个空白试验以控制全过程空白变化，空白值均不高于本测试方法检出限的 2/3。

测试选择的分析方法的检出限均达到或优于相关规范的要求。

5 数据价值

该数据集可为红层缺水区解决饮用水困难、兴国县和宁都县两县的区域规划建设、赣南苏区精准脱贫产业布局等，提供基础地质数据支撑。该数据集包含的 7 个钻孔，总体上有五大具体成果：

第一，本次项目所钻的水文钻孔除了科研功能以外，同时具有生产功能，这 7 个钻孔总出水量可达 4 565 m^3/d，彻底改变了当地约 3 000 名群众旱季缺水的窘况，钻孔的成功实施受到当地群众的赞誉；

第二，本次项目实施的 XGZK05 孔，井口水温 28.9 ℃，单井涌水量达到 2 125 m^3/d，验证了红层缺水区的找水方向，为探索总结红层盆地蓄水构造模式提供了基础数据资料，并可在此基础上进一步完善红层缺水区水文地质调查方法技术体系；

第三，本项目工程实施过程中还实现了兴国县地热勘查的点上突破，本数据集可支撑兴国县地热勘探靶区的圈定；

第四，数据集建设过程中获取的钻孔水样测试结果，发现 XGZK01 孔为稀有的富锂富锶优质天然饮用矿泉水，其中锂含量是国家标准的 8 倍，该处矿泉水的发现为兴国县开辟了特色矿泉水产业的绿色脱贫之路；

第五，数据集建设过程中发现，在宁都县小布镇发现偏硅酸矿泉水出露点 10 处，泉流量合计 4.936 L/S (426 m^3/d)。小布镇矿泉水调查数据和矿泉水分析测试结果，拓宽了小布镇未来特色小镇建设的发展之路。

6 结论

该数据集是在兴国县和宁都县开展 1：50 000 水文地质调查基础工作过程中，项目成果及时服务支撑脱贫攻坚的一个体现。项目结合地方扶贫需求与项目本身理论研究的需求，为当地施工 7 个水文钻孔，解决了 3 000 名群众缺水困境，矿泉水普查的实施为当地找到了优质矿泉水资源，还发现了兴国县的地热资源；通过开展地质扶贫找水工作，推动了红层盆地地下水赋存规律研究，探索水文地质调查、遥感解译技术运用、地球物理勘探技术方法组合和成果解释的新模式。

致谢：赣南兴国和宁都脱贫攻坚水文地质调查数据集是一项系统性工作，是项目组全体成员辛勤工作和慷慨付出的成果。另外，在数据集建设过程中，项目组得到了本单位技术委员会专家的指导和建议，在此对他们表示诚挚的谢意。同时，对江西有色地质勘查二队、赣南地质大队在项目实施阶段给予的数据、资料方面的支持表示感谢。

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1∶50 000 Hydrogeological Survey Dataset for Poverty Alleviation in Xingguo and Ningdu Counties, South Jiangxi

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Abstract: The new 1∶50 000 Hydrogeological Survey Dataset for Poverty Alleviation (also referred to as the Dataset) carried out in Xingguo County and Ningdu County, South Jiangxi is based on a water exploration project which aimed at alleviating poverty in southern Jiangxi under the unified deployment of the China Geological Survey, and the Ministry of Natural Resources of the People's Republic of China. It contains the results obtained from the survey designed to address the water shortage suffered by the people in local mountainous areas and to develop green water industries such as mineral water production for the local government. The Dataset comprises five sets of data: basic data of seven boreholes, stratum description information of seven boreholes, preliminary survey result of mineral water (21 survey points), analysis results of mineral water (15), and analysis results of drinking water (4), obtained from the project entitled *1∶50 000 Environmental Geological Survey along High-speed Railway Lines of Xianning–Yueyang and Nanchang–Huaihua in City Clusters of Middle Yangtze River* (*initiated by Hydrogeological and Environmental Geological Survey, China Geological Survey, Baoding*) from January to September 2017. Among these data, the basic data and stratum description information of boreholes mainly include information on boreholes such as location, diameter, depth, single well water yield, borehole sampling, stratum era and stratum bottom depth (m) revealed by the boreholes, as well as stratum lithology description. The preliminary survey result for mineral water mainly includes the location, on-site test indices,

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and origin analysis of the survey points. The analysis results for mineral water and drinking water came from lab tests of water samples obtained in the implementation of the project. Using the boreholes, the water shortage faced by 3 000 people has been directly addressed. Furthermore, the discovery of high-quality mineral water has provided new ideas for local economic growth.

Key words: South Jiangxi; Poverty alleviation; Hydrogeological survey; Drinking water; Groundwater dataset

Data service system URL: http://dcc.cgs.gov.cn

1 Introduction

The 1∶50 000 Hydrogeological Survey Dataset for Poverty Alleviation in Xingguo County and Ningdu County, South Jiangxi (also referred to as the Dataset) has been developed on the basis of publicly available information, with the aim to provide support for poverty alleviation in those counties in the province. The working area involved in the Dataset is located in Xingguo and Ningdu counties to the north of Ganzhou City. The area lies in a mountainous area, with the dominant landforms consisting of mid–low mountains and hills and a subtropical monsoon humid climate. In Xingguo and Ningdu counties, the annual precipitation ranges mostly from 1 500 ~ 1 700 mm and the main rivers fall within the Pinggujiang and Meijiang watersheds, both streams being tributaries of Gongshui River, the eastern source of Ganjiang River. In terms of geologic setting, the working area is situated at the intersection of the northeast end of the EW-strike tectonic zone of Nanling and the upheaval zone of Wuyi Mountain, having gone through multiple tectonic activities through several eras. In multiple basins developed in the working area, including Xingguo, Ningdu and Laicun, the continental-facies red rock series of the Cretaceous System are mainly distributed. With diluvial, lacustrine and fluvial sedimentary facies, these red rock series are a molasse-like structure formed in a hot and dry climate, constituting a sedimentary cycle of conglomerate–sandstone–conglomerate with a significant change in facies. In other basins developed in the area such as Qingtang and Meijiao, Carboniferous System rocks are mainly distributed. In addition, these basins are surrounded by metamorphic rocks formed in the Sinian and Cambrian systems as well as Caledonian and Yanshanian granites, with loose rocks sporadically distributed in a small area. With atmospheric precipitation as the main recharge of groundwater, the shallow cycle constitutes the dominant water cycle, most of which is discharged out of the ground surface in the form of springs or disperse flows. However, due to the influence of geological tectonics, stratal lithology, as well as topography and landform, the water-bearing formation complex is generally poor in water yield properties and fresh water of bicarbonate type and low mineralization is mainly developed in the area.

Basic information on the Dataset is summarized in Table 1.

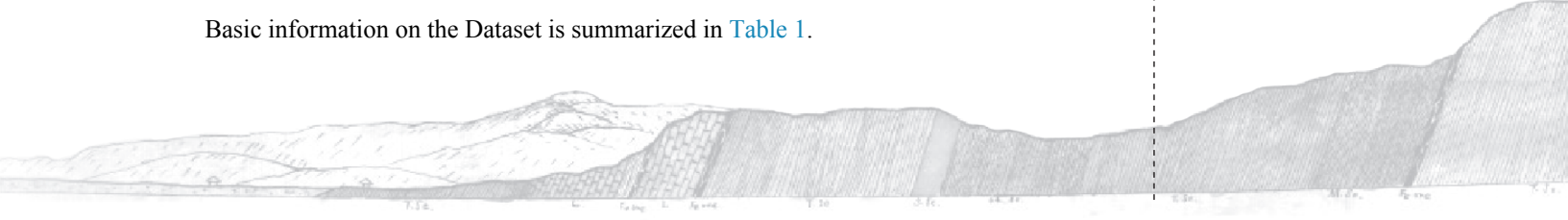

Table 1 Metadata Table of Database (Dataset)

Items	Description
Database (dataset) name	1∶50 000 Hydrogeological Survey Dataset for Poverty Alleviation in Xingguo and Ningdu Counties, South Jiangxi
Database (dataset) authors	Gong Lei, Hydrogeological and Environmental Geological Survey, China Geological Survey Wang Xinfeng, Hydrogeological and Environmental Geological Survey, China Geological Survey Song Mian, Hydrogeological and Environmental Geological Survey, China Geological Survey Li Hongyan, Hydrogeological and Environmental Geological Survey, China Geological Survey Xiao Zeyou, Gannan Geological Survey Group, Jiangxi Bureau of Geology and Minerals Exploration Hu Qifeng, The Second Team of Jiangxi Provincial Non-ferrous Metals Geological Exploration Bureau Wang Jin, GanNan Geological Survey Group, Jiangxi Bureau of Geology and Minerals Exploration Wu Linwei, The Second Team of Jiangxi Provincial Non-ferrous Metals Geological Exploration Bureau Wang Lei, The Second Team of Jiangxi Provincial Non-ferrous Metals Geological Exploration Bureau Miu Sai, The Second Team of Jiangxi Provincial Non-ferrous Metals Geological Exploration Bureau
Data acquisition time	2017.01—2017.09
Geographic area	Xingguo County and Ningdu County, Ganzhou City, Jiangxi Province
Data format	*.xlsx
Data size	69.90 KB
Data service system URL	http://dcc.cgs.gov.cn
Fund project	Jointly funded by China Geological Survey Project (DD20179262) and a project of the National Natural Science Foundation of China (No.41330314)
Language	Chinese
Database (dataset) composition	*Basic information of boreholes.xlsx*, *Stratum description of boreholes.xlsx*, *Preliminary survey of mineral water.xlsx*, *Analysis and test result of mineral water.xlsx*, and *Analysis and test result of drinking water.xlsx*

2 Method for Data Acquisition and Processing

2.1 Acquisition of Borehole Data

During the preparation of the Dataset, the data of all the boreholes drilled were recorded in accordance with *Specification for Hydrogeological Survey* (*1∶50 000*) (DZ/T 0282−2015) and the *Specification for Hydrological Well Drilling* (DZ/T 0148−2014). Furthermore, important data of boreholes were sorted out and integrated based on the need of the local government for poverty alleviation. As a result, *Basic information of boreholes.xlsx* and *Stratum description of boreholes.xlsx* were formed.

The water yield of boreholes was dually determined and verified by the triangular weir method and supersonic flowmeters. The water level depth of the boreholes was measured with

a water level meter (type: In-Situ Water Level Meter 200).

Water samples were taken at the end of the borehole pumping test and then were sent to relevant labs for detection. Among these water samples, mineral water analysis was conducted on those obtained from four boreholes with numbers XGZK01, XGZK02, XGZK05 and XGZK06 while drinking water analysis was conducted on those obtained from four more boreholes with numbers XGZK01, XGZK02, XGZK03 and XGZK04.

2.2 Acquisition of Mineral Water Survey Data

A mineral water survey was conducted in Xiaobu Town, Ningdu County from August 4 to August 6 in 2017, focusing on hydrogeological condition and spring flow in the places where spring water is exposed, as well as on-site indicator tests of the spring water. The statistical method, volumetric method, and triangular weir method were adopted to measure the spring flow. INSITU-SmartTroll, a multi-parameter survey meter, was used to conduct an on-site test of the indices including pH, electrical conductivity, dissolved oxygen (*DO*) and E_h. A metasilicic acid detection box was used to measure the metasilicic acid. Water samples for mineral water analysis were taken at survey points with an on-site test value of metasilicic acid of 25 ~ 50 mg/L or above. Then the samples were sent to relevant labs for further detection.

2.3 Collection and Data Processing of Water Samples

The technical requirements for sampling were developed in accordance with HJ 493−2009 *Water Quality Sampling−Technical Regulation of Preservation and Handling of Samples*, HJ 494−2009 *Water Quality−Guidance on Sampling Techniques*, and GB/T 5750.2−2006 *Standard Examination Methods for Drinking Water−Collection and Preservation of Water Samples*. Furthermore, the water samples were collected, preserved and delivered according to the technical requirements. There are 15 analysis results for mineral water and four analysis results for drinking water in the Dataset.

Test indices for mineral water analysis were determined in accordance with GB 8537−2008 *Drinking Natural Mineral Water* combined with actual conditions. Meanwhile, relevant standards for groundwater quality were also referred to. As a result, a total of 51 indices including lower limit and upper limit indices of water-quality specified in GB 8537−2008 *Drinking Natural Mineral Water* were selected during data collation. Test indices for drinking water analysis were determined in accordance with GB 5749−2006 *Standard for Drinking Water Quality* combined with actual conditions. As a result, 33 indices were selected during data collation.

All data were original without being processed; they were the selected test results from the labs.

3 Description of Data

The Dataset contains five Excel files named *Basic information of boreholes.xlsx*, *Stratum description of boreholes.xlsx*, *Preliminary survey of mineral water.xls*, *Analysis and test result of mineral water.xlsx*, and *Analysis and test result of drinking water.xlsx*.

The data file *Basic information of boreholes.xlsx* (Table 2) describes the basic information from the seven boreholes drilled for prospecting combined with exploration. The information of each borehole is listed in a row, including number, geographical location, depth, and diameter of the borehole; depth range of filter tube and normal pipe; static water depth; single well water yield; and sampling (mineral water analysis and drinking water analysis).

Table 2 File Structure of *Basic information of boreholes.xlsx*

No.	Name of data item	Data type	Example
1	Borehole number	String	XGZK01
2	Geographical location	String	Xixia Village, Butou Town, Xingguo County, Ganzhou City, Jiangxi Province
3	Borehole depth	Float	156
4	Borehole diameter	Float	305
5	Depth range of filter tube	Float	147.0 ~ 111.0 m
6	Depth range of normal pipe	Float	111.0 ~ 0 m
7	Static water depth	Float	15.46
8	Single well water yield	Float	432
9	Sampling	String	Mineral water analysis, drinking water analysis

The data file *Stratum description of boreholes.xlsx* (Table 3) describes the stratum information revealed by the seven boreholes drilled for prospecting combined with exploration. The following data are mainly included in the file: borehole number, era and code of the stratum, stratum bottom depth (m), name and color of rock and soil, and stratum lithology description.

Table 3 File Structure of *Stratum description of boreholes.xlsx*

No.	Name of data item	Data type	Example
1	Borehole number	String	XGZK01
2	Stratum era	String	Holocene Series, Quaternary System
3	Stratum code	String	Qh
4	Stratum bottom depth	Float	3
5	Name of rock and soil	String	Silty clay
6	Color of rock and soil	String	Reddish brown
7	Stratum lithology description	String	Soft-plastic, slightly wet

The data file *Preliminary survey of mineral water.xls* (Table 4) mainly describes the basic information on survey points for mineral water. There are 21 survey points in the file with the information of each survey point listed in one row, which includes field number, geographic location, and map sheet number of the survey point; spring water type; aquifer lithology of survey point; main purpose, recharge source, flow measurement method, flow, and dynamic feature of spring; temperature, chroma, taste, smell, transparency, pH value, E_h, oxygen consumption (*DO*), electrical conductivity, and HCO_3^- of water; sampling; remarks; and survey date and time.

Table 4 File Structure of *Preliminary survey of mineral water.xls*

No.	Name of data item	Data type	Example
1	Field number	String	SQ01
2	Geographical location	String	Hedanqiu Team, Shangchao Village, Xiaobu Town, Ningdu County, Jiangxi Province
3	Map-sheet number	String	Lingchi Map Sheet G50E007008
4	Spring water type	String	Ascending spring
5	Aquifer Lithology	String	Biotite adamellite (r25)
6	Main purpose	String	Supply for five households
7	Recharge source	String	Atmospheric precipitation
8	Flow measurement method	String	Volumetric method
9	Flow of spring	Float	0.095
10	Dynamic feature	String	Water volume is affected by season, rainfall is small and basically invariable, with ratio of dry and normal seasons of a year to one year of 90%
11	Spring water temperature	Float	19
12	Chroma	String	None
13	Taste	String	None
14	Smell	String	None
15	Transparency	String	Transparent
16	pH value	Float	6.58
17	E_h	Float	157
18	Oxygen consumption (*DO*)	Float	3.36
19	Electrical conductivity	Float	85.5
20	HCO_3^-	Float	59.34
21	Sampling	String	Total chemical analysis of mineral water
22	Remarks	String	Well: diameter: 110 cm; depth of water level: 49 cm; well depth: 85 cm; well wall structure: stone piled and laid; well built in 2015. Content of metasilicic acid: 25—50 mm/l
23	Survey date and time	Time	August 4, 2017

The data file *Analysis and test result of mineral water.xlsx* (please refer to the Dataset for the file structure) involves 15 samples in total and mainly includes five with basic information (sample number, field number, sampling date, sample receiving date, completion date), four sensory indices (chroma, turbidity, smell and taste, and visible materials), eight lower limit indices (Li, Sr, Zn, I, H_2SiO_3, Se, free CO_2, and total dissolved solids), 16 upper limit indices (Sb, As, Cu, Ba, Cd, total Cr, Pb, Hg, Mn, Ni, Ag, bromate, borate (B), NO_3^-, F^-, and oxygen consumption), three pollutant indices (volatile phenol, cyanide, NO_2^-), two microbiological indices (total number of bacterial colonies, and coliforms), and 20 other indices (pH, K^+, Na^+, Ca^+, Mg^+, Al^{3+}, NH_4^+, Cl^-, SO_4^{2-}, HCO_3^-, CO_3^{2-}, OH^-, soluble SiO_2, total hardness, temporary hardness, permanent hardness, negative hardness, total alkalinity, total acidity, and TFe).

The data file *Analysis and test result of drinking water.xlsx* (please refer to the Dataset for the file structure) involves four samples in total and mainly includes five pieces of basic

information (sample number, field number, sampling date, sample receiving date, completion date), one microbiological index (coliform), nine toxicological indices (As, Cd, total Cr, Pb, Hg, Se, cyanide, F^-, NO_3^-), and 23 general chemical indices (pH, K^+, Na^+, Ca^{2+}, Mg^{2+}, Al^{3+}, NH_4^+, Cl^-, SO_4^{2-}, HCO_3^-, CO_3^{2-}, Fe^{3+}, Mn, Cu, free CO_2, soluble SiO_2, Ag, I, NO_2^-, PO_4^{3-}, total dissolved solids, oxygen consumption, and volatile phenol).

4 Data Quality Control

(1) Quality control of exploration data

The data quality control of hydrogeological boreholes includes checks and collation of data as well as verification of single-point data. Various data of hydrogeological characteristics acquired were accepted according to DZ/T 0282−2015 *Specification for Hydrogeological Survey* (*1∶50 000*), DZ/T 0148−2014 *Specification for Hydrological Well Drilling*, etc., in order to ensure the authenticity and accuracy of the data.

(2) Quality control of survey data

In terms of data quality control of preliminary survey points for mineral water, relevant checks including check of data filled in manually and verification of electronic records during collation of all data were carried out, so as to ensure the data were filled in completely, normatively, and accurately. A three-level management system was adopted during the checks.

(3) Quality control of test data of water samples

All water samples were tested in the Nanchang Supervision and Inspection Center of Mineral Resources, Ministry of Land and Resources (Geological Survey of Jiangxi Province).

Standard solution sample insertion and standard recovery tests were adopted to guarantee the accuracy of water sample tests. Test value being within two times of uncertainty range of a given reference value and the recovery rate ranging from 90% ~ 110% were taken respectively as the acceptance criteria of the two methods.

Repeated tests were adopted to ensure the precision of water sample tests. 20% of the water samples in each batch were randomly selected for verification. They were encoded and tested at the same time. The permitted limit of relative deviation (Y=11.0 $C \cdot X^{-0.28}$) of water quality tests stipulated in DZ/T0130.6-2006 *The Specification of Testing Quality Management for Geological Laboratories – Part6: Water Analysis* (Ma HY et al., 2018) was adopted as the acceptance criterion.

For each batch of the samples, two blank tests were conducted at the same time in the lab in order to control the change of the blank tests throughout the whole process. All of the blank values were not higher than two-thirds of the detection limits. The detection limits of the analysis methods selected for water sample tests reached or exceeded the requirements in the applicable codes.

5 Value of the Data

The Dataset can provide basic geological data on red beds for the settlement of the drinking water shortage in water-shortage areas, for regional planning and construction in

Xingguo County and Ningdu County and thus provides for the industrial layout of accurate poverty alleviation in original Soviet political areas of South Jiangxi. Five main specific achievements were made through seven boreholes contained in the Dataset:

Firstly, in addition to the scientific research function, these hydrogeological boreholes drilled can be put into production, since the total water yield of the seven is about 4 565 m^3/d. In this way, the predicament of water shortage suffered in summer by about 3 000 local people can be completely changed. Therefore, these successfully drilled boreholes were highly praised by local people.

Secondly, the borehole XGZK05 with a water temperature of 28.9 ℃ at the wellhead and a water yield of 2 125 m^3/d verifies the orientation of water exploration in water-shortage areas in red beds and provides basic data and information for exploration and a summary of the water-storage structure patterns in basins in red beds. Furthermore, the method and technical system for hydrogeological survey in the areas can be improved.

Thirdly, breakthroughs were made in the geothermal survey points in Xingguo County. Based on this, geothermal exploration target areas in that area can be further delineated.

Fourthly, according to the test results of water samples obtained in the boreholes, the water in the borehole XGZK01 is a rare mix of Li-rich and Sr-rich natural drinking mineral water, with Li content eight times the relevant national standard. This opens up the way of green poverty alleviation for Xingguo County, i.e. via a major mineral water industry.

Lastly, it is found that there are ten places where metasilicic acid mineral water exposed in Xiaobu Town, Ningdu County, with a total flow of 4 936 L/S (426 m^3/d). The survey data as well as the results of analysis and tests of the mineral water in Xiaobu Town will provide an extensive way for the town to be developed into a substantial town in the future.

6 Conclusion

The Dataset was obtained through the basic work of the 1∶50 000 hydrogeological survey in Xingguo County and Ningdu County, reflecting that the achievements can timely serve the need for poverty alleviation. With this local need and the theoretical research under consideration, seven hydrological boreholes were drilled, by which the drinking water shortage suffered by about 3 000 people has been addressed. Furthermore, not only high-quality mineral water resources but also geothermal resources were discovered in Xingguo County during the primary survey for mineral water. In addition, water exploration by the geological survey for poverty alleviation also promotes research on the occurrence law of groundwater in basins in red beds, the exploration of new patterns involving hydrogeological survey combined with the application of remote-sensing interpretation technology and geophysical exploration technology as well as result explanation.

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