doi: 10.12029/gc2017Z112

论文引用格式：刘焕贵，赖华福. 2017. 江西省崇义聂都瓦窑坑白钨矿区资源储量数据集[J]. 中国地质，44(S1): 96−104.

数据集引用格式：刘焕贵，赖华福. 2017. 江西省崇义聂都瓦窑坑白钨矿区资源储量数据集[DB]. 全球地质数据，DOI: 10.23650/data.E.2017.NGA105570.B1.1.1.

收稿日期：2017-05-09
改回日期：2017-07-20

项目：崇义聂都章源钨矿（瓦窑坑白钨矿区）资源储量地质调查项目资助。

# 江西省崇义聂都瓦窑坑白钨矿区资源储量数据集

刘焕贵　赖华福

（江西省赣州市地质队，江西 赣州 341004）

**摘要：**南岭是中国钨矿高度集中的地区。崇义县聂都章源钨矿（瓦窑坑白钨矿区）即位于南岭构造带之崇（义）—（大）余—（上）犹钨锡成矿区内。该矿床属于矽卡岩型钨矿。该矿区因合理规划矿山生产和办理采矿许可证延续之需，委托江西省赣州市地质队在充分收集以往地质资料的基础上，对矿权范围已发现矿体补充开展了部分勘查地质工作后编制了资源储量地质报告，并附有多张关于资源储量的数据表形成的数据集。数据集共包含七个数据表（.doc 格式），采用国家标准对矿区白钨矿的品位、资源储量、保有储量等进行了测试与估算，精度满足资源储量估算要求。数据集可对周边同类型矿床的资源储量评估做一参考，同时对研究矿床的分型与分带情况也具有参考意义。

**关键词：**白钨矿；资源储量；数据集；江西崇义

**数据服务系统网址：**http://dcc.cgs.gov.cn

## 1　引言

南岭，尤其是赣南、粤北和湘东南地区，是中国乃至世界上钨矿最丰富、最集中分布的地区。长期的勘查、生产和科学研究成果均已显示，南岭地区的钨矿床不仅储量巨大，而且类型比较齐全（华仁民等，2008, 2015；赵盼捞等，2016；王旭东等，2012）。江西省崇义县崇义聂都瓦窑坑白钨矿区处于南岭构造带稀有－有色金属成矿带，即崇义—大余—上犹钨锡成矿区内，区域地层以上古生界和下古生界为主，褶皱断裂构造发育，岩浆活动频繁，钨、锡（稀有、稀土）等成矿条件良好，矿产丰富，是南岭钨矿高度集中的地区（陈郑辉等，2006；赵丰等，2006；刘善宝等，2008；张大权等，2012）。

本区位处南岭构造带之崇（义）—（大）余—（上）犹钨锡成矿区内（图 1）。矿区出露地层较简单，除沟谷低洼处见第四系冲积及残坡积物外，主要见上奥陶统古亭组，岩性以板岩、粉砂质板岩为主，夹大理岩等碳酸盐岩。区内构造形变主要表现为断裂较发育，断裂走向多呈北东或北东东向。矿区南部岩浆岩发育，岩性主要为似斑状中粒（或细粒）黑云母花岗岩，属燕山早期第一阶段产物。岩体与上奥陶统古亭组碳酸盐岩接触带广泛见及矽卡岩化，本区钨矿化即分布于矽卡岩化的接触带内。

第一作者简介：刘焕贵，男，高级工程师，主要从事矿产勘查工作；E−mail:liuhuangui@126.com。

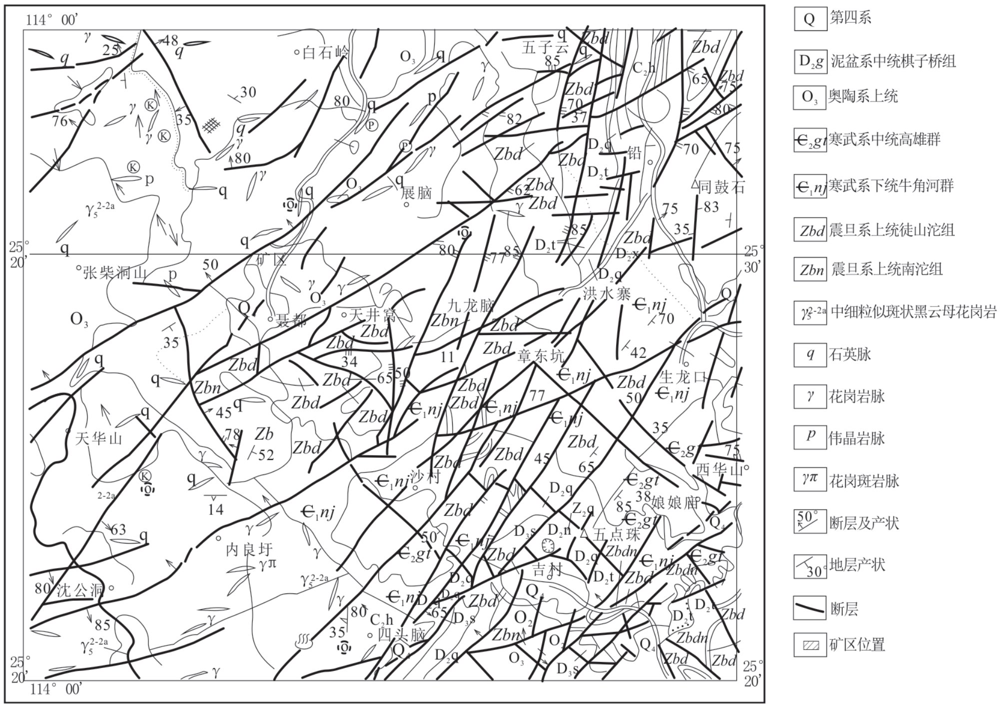


**图 1　崇义聂都瓦窑坑白钨矿区所处区域地质略图（比例尺：1：200000）**

区内已发现 3 个白钨矿体，编号Ⅰ、Ⅱ、Ⅲ。Ⅰ矿体为主要矿体，总体呈带状产于矿区中部，矿体走向北东，倾向北西 300°~350°，倾角 30°~80° ，矿体长约 140 m，倾向延深大于 50 m，矿体厚 0.9~34 m，平均 11 m，矿体形态多变，多呈囊状、透镜状产出。矿床成因类型属中—高温热液接触交代矿床。工业类型属矽卡岩钨矿。对该矿床进行资源储量的调查与评估，可以对周边矿床的资源储量做一参考，同时对研究南岭地区同类型矿床的分带分型情况也具有参考意义。

江西省崇义县崇义聂都瓦窑坑白钨矿区的资源储量数据集为 Word 文档型数据，包含 7 个表格，分别为“崇义聂都瓦窑坑白钨矿区样品登记表”、“崇义聂都瓦窑坑白钨矿区钻孔单工程矿体顶底板坐标及厚度品位计算表”、“崇义聂都瓦窑坑白钨矿单工程矿体平均水平厚度、平均品位计算表”、“崇义聂都瓦窑坑白钨矿块段矿体平均水平厚度、平均品位计算表”、“崇义聂都瓦窑坑白钨矿区体重测试结果表”、“崇义聂都瓦窑坑白钨矿区矿体资源储量估算表”、“崇义聂都瓦窑坑白钨矿区保有资源储量汇总表”。

江西省崇义聂都章源钨矿资源储量数据集元数据简表如表 1 所示。

## 2　数据采集和处理方法

### 2.1　样品采集

本次调查工作所采集的样品来自探槽和钻孔岩心，采用刻槽和劈芯的方法进行采样，共采集样品 270 个。采集的样品包含如下类型：含钨矽卡岩、矽卡岩化变质砂岩、矽卡岩化斑状黑云母花岗岩、矽卡岩化花岗岩、矽卡岩、矽卡岩化变质粉砂岩、矽卡岩化变质砂板岩、硅石。钻孔矿心采用劈半法，按样长 2 m 连续采样。坑内、地表矿体以 10 cm×5 cm 规格，2 m 一个样品连续刻槽采样。组合样采用单工程组合，一般视地质

情况变化，在矽卡岩体内 8~10 个样品为一组合，大于 10 个样品则分为 2 个组合样，如矽卡岩化较弱地段不连续则视采样情况按样分段组合。

**表 1　数据库（集）元数据简表**

| 条目 | 描述 | | |
|---|---|---|---|
| 数据库（集）名称 | 江西省崇义聂都瓦窑坑白钨矿区资源储量数据集 | | |
| 数据作者 | 刘焕贵，江西省赣州市地质队<br>赖华福，江西省赣州市地质队 | | |
| 数据时间范围 | 2006 年 6 月—2007 年 3 月 | | |
| 地理区域 | 江西省崇义县聂都乡 | | |
| 数据格式 | .doc | 数据量 | 1.43 MB |
| 数据服务系统网址 | http://dcc.cgs.gov.cn | | |
| 语种 | 中文 | | |
| 数据库（集）组成 | 数据集主要包含 7 个 word 文档表格，分别为“崇义聂都瓦窑坑白钨矿区样品登记表”、“崇义聂都瓦窑坑白钨矿区钻孔单工程矿体顶底板坐标及厚度品位计算表”、“崇义聂都瓦窑坑白钨矿单工程矿体平均水平厚度、平均品位计算表”、“崇义聂都瓦窑坑白钨矿块段矿体平均水平厚度、平均品位计算表”、“崇义聂都瓦窑坑白钨矿区体重测试结果表”、“崇义聂都瓦窑坑白钨矿区矿体资源储量估算表”、“崇义聂都瓦窑坑白钨矿区保有资源储量汇总表” | | |

### 2.2　测试方法

样品的委托测试单位为核工业地质局二六四大队实验室，体重样采用常规湿腊法进行测试，化验分析采用常规测试法。

### 2.3　资源储量估算方法

#### 2.3.1　采用的工业指标

参展《钨、锡、汞、锑矿产地质勘查规范》矽卡岩型白钨矿一般工业要求采用如下工业指标：

边界品位：（$WO_3$）0.08%，

最低工业品位：（$WO_3$）0.15%，

可采厚度：≥ 1m，

夹石剔除厚度：≥ 3m。

#### 2.3.2　资源储量估算方法的选择

根据矿体的产状、形态，选择地质块段法，在矿体垂直纵投影剖面图上进行资源储量估算。

资源储量估算公式：$Q=V\times D$

$V=S\times h$

$P=Q\times C$

$S$—矿块投影面积（$m^2$），

*h*—矿块平均水平厚度，

*V*—矿石体积（$m^3$），

*D*—矿石体重（$T/m^3$），

*Q*—矿石量（t），

*C*—$WO_3$ 含量（%），

*P*—$WO_3$ 金属量（t）。

2.3.3 资源储量估算主要参数的确定

（1）矿块面积的确定

在资源储量估算总投影剖面图上，由计算机图形文件直接读出。

（2）水平厚度的确定

单工程矿体水平厚度采用该工程内切穿矿体厚度连续样品的实测水平厚度之和。槽探与坑道取样大多为垂直矿体走向，因考虑地形地理条件部分为斜交矿体走向，因此，槽探斜交矿体采用 $\sin\alpha$= 水平厚度 / 样槽内矿体样长（$\alpha$ 为矿体走向与探槽走向夹角）求水平厚度。钻孔由于各钻孔浅，且均为直孔，水平厚度为样品代表长度与矿体倾角余切的乘积，$h=(l/n)\mathrm{ctg}\beta$（$h$ 为水平厚度，l 为矿心长度，$n$ 为采取率，$\beta$ 为矿体倾角）。矿块矿体水平厚度为矿块内各单工程矿体水平厚度的算术平均值。

（3）平均品位的确定

单工程平均品位采用工程内连续的样品品位与厚度加权平均算得，即：

$$C=(C_1m_1+C_2m_2+\cdots\cdots+C_nm_n)/(m_1+m_2+\cdots\cdots+m_n),$$

C 为单工程平均品位，

$C_1$、$C_2$、……、$C_n$ 为工程中各样品品位，

$m_1$、$m_2$、……$m_n$ 为各个样品的水平厚度。

矿块平均品位采用各单工程加权平均品位算得。

2.3.4 资源储量类型的划分

根据地质工作程度确定资源储量类型，凡满足 50 m×40 m 控制网度深部有两个以上达工业指标的探矿工程质量点控制的内圈矿块资源储量类型为 122b 类，其他定为 333 类。凡有外推点的矿块资源储量类型定为 333 类，矿区内矿体地质块段划分为 7 段，分别为Ⅰ号矿体：122b-1、333-1、333-2；Ⅱ号矿体：333-1；Ⅲ号矿体：333-1；全区 122b 一块，333 四块。

## 3 数据样本描述

“崇义聂都瓦窑坑白钨矿区样品登记表”（表 2）包含如下内容：工程号、样号（野外编号、化验编号）、采样位置（单位 m）、样长（单位 m）、矿体水平宽（单位 m）、采样方法、（岩）矿石类型、分析结果 ($WO_3$、Mo、Cu、Pb、Zn、Sn)、矿体样品段（品位 %、矿体）、备注。

“崇义聂都瓦窑坑白钨矿区钻孔单工程矿体顶底板坐标及厚度品位计算表”（表 3）包括如下内容：矿体号、勘探线号、工程号、样号（野外编号）、采样位置（单位 m）、样长（单位 m）、单样品位 $WO_3$（%）、顶板坐标（$X$、$Y$、$H$）、底板坐标（$X$、$Y$、$H$）、矿体倾向（单位度）、矿体倾角（单位度）、真厚度（单位米）、水平厚度（单位米）、单

工程厚度（米）品位（%）。

“崇义聂都瓦窑坑白钨矿单工程矿体平均水平厚度、平均品位计算表”（表4）包括如下内容：矿体号、勘探线号、工程号、野外编号、样长 (m)、样品个数、样品总长 (m)、槽探方向与矿体走向夹角（度）、水平厚度 (m)、矿体倾向 (°)、矿体倾角 (°)、矿体走向 (°)、槽探方向 (°)、单样品位 ($WO_3$，%)、单工程（采样点）厚度（m）品位 (%)、备注。

“崇义聂都瓦窑坑白钨矿块段矿体平均水平厚度、平均品位计算表”（表5）包括如下内容：矿体号、块段号、单工程（采样点）(包括工程（样）号、水平厚度 (m)、$WO_3$(%))、加权品位 ($WO_3$，%)、矿块平均（厚度、$WO_3$%）、备注。

“崇义聂都瓦窑坑白钨矿区体重测试结果表”（表6）包括如下内容：样号、采样位置及矿体、体重测试结果（$T/m^3$）、$WO_3$(%)、委托测试单位、备注。

“崇义聂都瓦窑坑白钨矿区矿体资源储量估算表”（表7）包括如下内容：矿体号、资源储量类型、矿块号、矿块面积 ($m^2$)、平均厚度 (m)、体积 ($m^3$)、减采空体积 ($m^3$)、实际体积 ($m^3$)、体重 ($T/m^3$)、矿石量 (t)、品位 (%)、$WO_3$ 金属量 (T)、备注。

“崇义聂都瓦窑坑白钨矿区保有资源储量汇总表”（表8）包括如下内容：矿体号、资源储量类型、矿石量 (kt)、平均品位 $WO_3$（%）、$WO_3$ 金属量 (t)、备注。

**表2　崇义聂都瓦窑坑白钨矿区样品登记表**

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 1 | 工程号 | | 字符型 | 555D1 |
| 2 | 样号 | | 字符型 | |
| | 野外编号 | | 字符型 | H1 |
| | 化验编号 | | 字符型 | Y06-2383 |
| 3 | 采样位置 | | 字符型 | |
| | 自 | m | 浮点型 | 0 |
| | 至 | m | 浮点型 | 2 |
| 4 | 样长 | m | 浮点型 | 2 |
| 5 | 矿体水平宽 | m | 浮点型 | |
| 6 | 采样方法 | | 字符型 | 刻槽 |
| 7 | （岩）矿石类型 | | 字符型 | 含钨矽卡岩 |
| 8 | 分析结果 | % | 浮点型 | |
| | $WO_3$ | % | 浮点型 | 0.02 |
| | Mo | % | 浮点型 | 0.03 |
| | Cu | % | 浮点型 | 0.14 |
| | Pb | % | 浮点型 | 0.002 |
| | Zn | % | 浮点型 | 0.019 |
| | Sn | % | 浮点型 | 0.01 |
| 9 | 矿体样品段 | | 字符型 | |
| | 品位 | % | 浮点型 | |
| | 矿体 | | 字符型 | |
| 10 | 备注 | | 字符型 | |

表 3　崇义聂都瓦窑坑白钨矿区钻孔单工程矿体顶底板坐标及厚度品位计算表

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 1 | 矿体号 | | 字符型 | I |
| 2 | 勘探线号 | | 字符型 | 4 线 |
| 3 | 工程号 | | 字符型 | ZK401 |
| 4 | 野外编号 | | 字符型 | H2 |
| 5 | 采样位置 | | 浮点型 | |
| | 自 | m | 浮点型 | 3.5 |
| | 至 | m | 浮点型 | 5.5 |
| 6 | 样长 | m | 浮点型 | 2 |
| 7 | 单样品位 $WO_3$ | % | 浮点型 | 0.15 |
| 8 | 顶板坐标 | | 浮点型 | |
| | X | | 浮点型 | 2822117 |
| | Y | | 浮点型 | 38510923 |
| | H | | 浮点型 | 552.4 |
| 9 | 底板坐标 | | 浮点型 | |
| | X | | 浮点型 | 2822117 |
| | Y | | 浮点型 | 38510923 |
| | H | | 浮点型 | 550.4 |
| 10 | 矿体倾向 | ° | 浮点型 | 353 |
| 11 | 矿体倾角 | ° | 浮点型 | 32 |
| 12 | 真厚度 | m | 浮点型 | 1.7 |
| 13 | 水平厚度 | m | 浮点型 | 3.2 |
| 14 | 单工程厚度 品位 | | 字符型 | |
| | 真厚度 | m | 浮点型 | |
| | 水平厚度 | m | 浮点型 | 3.2 |
| | $WO_3$ | % | 浮点型 | 0.15 |

表 4　崇义聂都瓦窑坑白钨矿单工程矿体平均水平厚度、平均品位计算表

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 1 | 矿体号 | | 字符型 | I |
| 2 | 勘探线号 | | 字符型 | 2W |
| 3 | 工程号 | | 字符型 | TC11 |
| 4 | 野外编号 | | 字符型 | H87 |
| 5 | 样长 | m | 浮点型 | 2 |
| 6 | 样品个数 | | 浮点型 | 7 |
| 7 | 样品总长 | m | 浮点型 | 14 |

续表 4

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 8 | 槽探方向与矿体走向夹角 | ° | 浮点型 | 58 |
| 9 | 水平厚度 | m | 浮点型 | 11.80 |
| 10 | 矿体倾向 | ° | 浮点型 | 332 |
| 11 | 矿体倾角 | ° | 浮点型 | 72 |
| 12 | 矿体走向 | ° | 浮点型 | 242 |
| 13 | 槽探方向 | ° | 浮点型 | 300 |
| 14 | 单样品位 $WO_3$ | % | 浮点型 | 0.15 |
| 15 | 单工程（采样点）厚度 品位 | | 字符型 | |
| | 水平厚度 | m | 浮点型 | 11.8 |
| | $WO_3$ | % | 浮点型 | 0.389 |
| 16 | 备注 | | 字符型 | |

**表 5　崇义聂都瓦窑坑白钨矿块段矿体平均水平厚度、平均品位计算表**

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 1 | 矿体号 | | 字符型 | I |
| 2 | 块段号 | | 字符型 | 122b-1 |
| 3 | 单工程（或采样点） | | 字符型 | |
| | 工程（样）号 | | 字符型 | TC11 |
| | 水平厚度 | m | 浮点型 | 11.8 |
| | $WO_3$ | % | 浮点型 | 0.389 |
| 4 | 加权品位 $WO_3$ | % | 浮点型 | 4.5902 |
| 5 | 矿块平均 | | 字符型 | |
| | 厚度 | m | 浮点型 | 11.9 |
| | $WO_3$ | % | 浮点型 | 0.224 |
| 6 | 备注 | | 字符型 | |

**表 6　崇义聂都瓦窑坑白钨矿区体重测试结果表**

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 1 | 样号 | | 字符型 | D1 |
| 2 | 采样位置及矿体 | | 字符型 | 561 中段 561D2（I） |
| 3 | 体重测试结果 | $T/m^3$ | 浮点型 | 2.57 |
| 4 | $WO_3$ | % | 浮点型 | 0.003 |
| 5 | 委托测试单位 | | 字符型 | 核工业地质局二六四大队实验室 |
| 6 | 备注 | | 字符型 | 常规湿腊法测试 |

表 7　崇义聂都瓦窑坑白钨矿区矿体资源储量估算表

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 1 | 矿体号 | | 字符型 | I |
| 2 | 资源储量类型 | | 字符型 | 122b |
| 3 | 矿块号 | | 字符型 | 122b-1 |
| 4 | 矿块面积 | $m^2$ | 浮点型 | 1933 |
| 5 | 平均厚度 | m | 浮点型 | 11.9 |
| 6 | 体积 | $m^3$ | 浮点型 | 23003 |
| 7 | 减采空体积 | $m^3$ | 浮点型 | 3000 |
| 8 | 实际体积 | $m^3$ | 浮点型 | 23003 |
| 9 | 体重 | $T/m^3$ | 浮点型 | 2.84 |
| 10 | 矿石量 | t | 浮点型 | 56808 |
| 11 | 品位 | % | 浮点型 | 0.224 |
| 12 | $WO_3$ 金属量 | T | 浮点型 | 127.3 |
| 13 | 备注 | | 字符型 | |

表 8　崇义聂都瓦窑坑白钨矿区保有资源储量汇总表

| 序号 | 字段名称 | 量纲 | 数据类型 | 实例 |
|---|---|---|---|---|
| 1 | 矿体号 | | 字符型 | I |
| 2 | 资源储量类型 | | 字符型 | 122b |
| 3 | 矿石量 | kt | 浮点型 | 56.81 |
| 4 | 平均品位 $WO_3$ | % | 浮点型 | 0.224 |
| 5 | $WO_3$ 金属量 | T | 浮点型 | 127.3 |
| 6 | 备注 | | 字符型 | |

## 4　数据质量控制和评估

对矿区主要工程点（窿口、钻孔、探槽）采用全站仪按照国家测量规范要求进行测量，并与国家坐标点进行联测，精度可以满足资源储量估算要求。

钻孔矿芯采用劈半法，按样长 2 m 连续采样，钻探质量满足规范要求。

外检样品 33 个，占样品总数 16%，委托江西省有色金属产品质量监督检验站进行外检分析对比。内检样品 26 个，占样品总数 12.8%，进行自检。根据基本分析结果和内外检结果对比，测试结果基本准确可靠，外检合格率 91%，内检合格率 96.1%，基本满足储量估算要求。

## 5　结论

江西省崇义聂都瓦窑坑白钨矿区资源储量数据集共包含 7 个数据表（.doc 格式），分别为“崇义聂都瓦窑坑白钨矿区样品登记表”、“崇义聂都瓦窑坑白钨矿区钻孔单工程矿体顶底板坐标及厚度品位计算表”、“崇义聂都瓦窑坑白钨矿单工程矿体平均水平厚度、

平均品位计算表”、“崇义聂都瓦窑坑白钨矿块段矿体平均水平厚度、平均品位计算表”、“崇义聂都瓦窑坑白钨矿区体重测试结果表”、“崇义聂都瓦窑坑白钨矿区矿体资源储量估算表”、“崇义聂都瓦窑坑白钨矿区保有资源储量汇总表”。 数据集可对周边同类型矿床的资源储量评估做一参考，同时对研究矿床的分型与分带情况也具有参考意义。

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（责任编辑　杨艳　贾丽琼）

doi: 10.12029/gc2017Z112

Article Citation:Liu Huangui, Lai Huafu. 2017. The resource reserves dataset of the Wayaokeng scheelite mining area, Niedu, Chongyi, Jiangxi Province [J]. Geology in China, 44(S1):118−127.
Dataset Citation:Liu Huangui, Lai Huafu. 2017. The resource reserves dataset of the Wayaokeng scheelite mining area, Niedu, Chongyi, Jiangxi Province [DB]. Global Geology Data, DOI:10.23650/data.E.2017.NGA105570.B1.1.1

Received: 09-05-2017
Accept: 20-07-2017

Fund support: Supported by The Geological Investigation of Resource Reserves in Chongxi Niezhangyuan Tungsten Mine (Wakao Keng Chitosan Area) Resources in Ganzhou City, Chongyi County, Jiangxi Province.

# The Resource Reserves Dataset of the Wayaokeng Scheelite Mining Area, Niedu, Chongyi, Jiangxi Province

LIU Huangui, LAI Huafu

(*Ganzhou Geological Team of Jiangxi Province, Ganzhou* 341004*, Jiangxi, China*)

**Abstract**: Nanling is a highly concentrated area of tungsten/scheelite ore in China. The Wayaokeng scheelite mining area is located in the Chong (yi)—(Da) yu—(Shang) yu tungsten and tin metallogenic belt, which is within Nanling tectonic belt. The Wayaokeng scheelite deposit is a skarn mineral deposit. Due to reasonable planning of mine production and continued processing of mining permits, the Ganzhou geological team of Jiangxi Province collected previous geological data, and carried out geological work. The resource reserve geological report was prepared with a number of data sets for the data tables for resource reserves by the Ganzhou geological team of Jiangxi Province. The dataset contains seven tables (.doc format). The standard, resource reserves and reserves of the scheelite in the mining area are tested and estimated by using the national standard, and the precision meets the requirement of resource reserve estimation. The dataset can be used as a reference for the assessment of the reserves of the same type of deposits in the surrounding area, and also has reference significance for the study of the classification and zoning of the deposits.
**Keywords:** scheelite; resource reserves; dataset; Chongyi, Jiangxi province
**Data service system URL:** http://dcc.cgs.gov.cn

## 1 Introduction

Nanling, especially the South Jiangxi province, North Guangdong province and Southwest Hunan has the most abundant and centralized distribution regions of tungsten deposits in China even globally. Long−term exploration, production and the outcomes of scientific experiments have all shown that the tungsten deposit in the Nanling area has not only very large reserves, but also quite completed types (Hua Renmin et al., 2008, 2015; Zhao Panlao et al. 2016; Wang Xundong et al. 2012). The Wayakeng scheelite mining area at Chongyi, near Niedu in Chongyi country, Jiangxi province lies in the Nanling structural belt and the rare-nonferrous metallogenic belt, namely, in the Chongyi—Dayu—Shangyou tungsten-tin metallogenic province. This latter province is a region which is dominated by Lower and Upper Paleozoic stratigraphy, well−developed folds and faults, replete with frequent magmatic activity, favorable for the metallogenetic conditions for tungsten and tin (rare and rare earth), etc., rich in oil and mineral resources as well as the highly concentrated Nanling tungsten deposit (Chen Zhenhui et al., 2006; Zhao Feng et al., 2006; Liu Shanbao et al., 2008; Zhang Daquan et al., 2012).

This region is located in the Chong (Yi)—(Da) Yu—Shang (You) tungsten−tin

**About the first author:** LIU Huangui, male, senior engineer, mainly engages in mineral exploration; E−mail: liuhuangui@126.com.

metallogenic province of the Nanling structural belt (Figure 1). The outcropping formations in the mining area are relatively simple. Except for the Quaternary alluvial and residual-slope accumulation sediments seen in the low-lying parts of the valley, we can see mainly the Guting Formation in the upper series of the Ordovician system, the lithology of which is dominated by slate and silty slate, clipping marble and carbonate. The tectonic deformations in the region are mainly characterized by the relative development faults with strikes mostly in NE or NEE directions. The magmatic development in the south of the mining area, where the lithology is porphyraceous medium−or fine−grained biotite granite, belong to the production of the first stage of the Early Yanshanian. Skarnization is widely found in the carbonate contact zone of the Guting Formation where it connects with the granite rock mass. The tungsten mineralization of this region is distributed in the skarn contact zone.

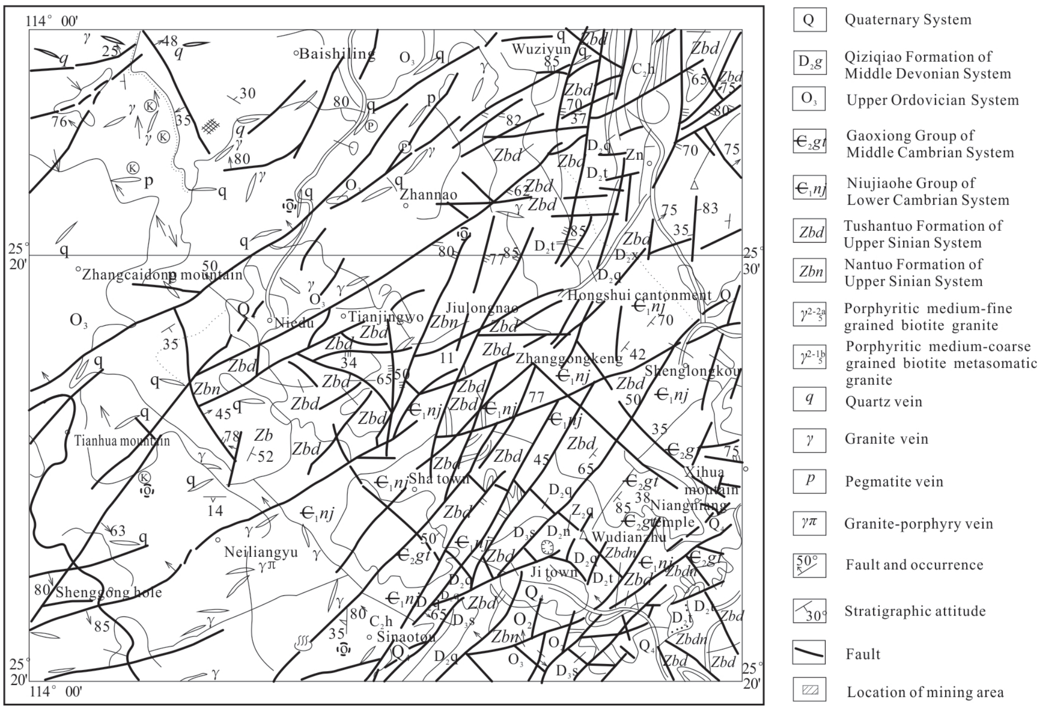


Fig.1 The geology map of the Wayaokeng scheelite mining area, Niedu, Chongyi (plotting scale 1:200000)

Three scheelite orebodies have been found in the mining area, numbered I, II, and III. Orebody I is the major one, which is generally produced in the shape of a ribbon. The strike of the I orebody is to the NE direction, with dip direction NW 300°−350°, dip 30°−80°, length about 140 m, dip extension greater than 50 m, thickness 0.9−34 m, and average thickness 11m. The shape varies and is mostly lenticular and cystic shaped. The genetic type belongs to the medium−high hydrothermal contact metasomatic deposit. The industrial type belongs to skarn tungsten. The investigation and assessment of the resource reserves of this deposit can be used as a reference for the resource reserves of surrounding deposits, and they also have reference significance in the study of the conditions of the zonation and classification of the same kind of deposit in Nanling district.

The resource reserves data set of the Wayaokeng scheelite mining area Chongyi, Niedu, Zhangyuan, in Chongyi country, Jiangxi province is in the form of a Word document, which includes seven tables as shown below in the simple list of the resource reserves data set for tungsten ores (Table 1).

**Table 1 Metadata table of dataset(s)**

| Items | Description |
|---|---|
| Database (dataset) name | The Resource Reserves Dataset of the Wayaokeng Scheelite Mining Area, Niedu, Chongyi, Jiangxi Province |
| Database authors | Liu Huangui & Lai Huafu, Geological Team of Ganzhou City, Jiangxi Province |
| Data acquisition time | June, 2006—March, 2007 |
| Geographic area | Jiangxi province, Chongyi Country, Niedu Township |
| Data format | .doc |
| Data size | 1.43 MB |
| Data service system URL | http://dcc.cgs.gov.cn |
| Language | Chinese |
| Database (dataset) composition | The resource reserves data set of Wayaokeng scheelite mining area Chongyi, Niedu, in Chongyi country, Jiangxi province is a Word document with 7 tables: sample registration forms; calculation of the top and floor coordinates and the thickness and ore grade of the orebody in a drilling single engineering; calculation of the average horizontal thickness and average ore grade of a drilling single engineering; calculation of the average horizontal thickness and average ore grade of orebody blocks; weight test results; estimation of ore resource reserves; and summary of retained reserves for the area |

## 2 Data collection and Processing method

### 2.1 Sample collection

The 270 samples collected came from trench and drilling core in the study area. The methods of notch groove and split core are used in this survey. The types of samples collected include: tungsten−bearing skarn, skarnized metamorphosed sandstones, skarnized porphyritic biotite granite, skarnized granite, skarnized metamorphosed siltstone, skarnized metamorphosed sandy slate, and silica. The split−half method was used for the drilling ore core and the sample length of continuous sampling is 2m. The orebody in pits or outcrops to the surface was collected every 2 meters using the method of notch groove continuous sampling with a length standard of 10 cm×5 cm. The single engineering combination was used in composite sampling, but it depends on the changes in geological conditions. Eight to 10 samples are one group and more than 10 samples are divided into two groups in the skarn body. We see the situation of sampling to segmentation and combination, if a weak section with skarnization is discontinuitous.

### 2.2 Test method

The entrusted testing department is the laboratory of the 264 team, Nuclear Industry Geological Bureau. The wet wax method is used regularly to the weight sampling, and the regular testing method is used to assay and for analysis.

## 2.3 Estimation method of ore resource reserves

### 2.3.1 Industry indicators adopted

The industrial requirements of skarn−type scheelite use the following indicators adopted from the *Standard of Mineral Geological Exploration.*

Cutoff grade: ($WO_3$) 0.08%,

Lowest industrial grade ($WO_3$) 0.15%,

Mineable thickness: ⩾ 1m,

The rock eliminating thickness of ore: ⩾ 3m.

### 2.3.2 Selection of the resource reserves estimation method

We selected the geological block method according to the occurrence and shape of the orebody, and the estimation of the resource reserves is in the longitudinal profile of the orebody.

The resource reserves estimation formula: $Q=V \times D$

$$V=S \times h$$

$$P=Q \times C$$

*S*—Projection area of the ore block ($m^2$),

*h*—Average horizontal thickness of ore block,

*V*—Volume of ore ($m^3$),

*D*—Weight of ore ($m^3$),

*Q*—Ore reserves (ton),

*C*—Content of $WO_3$ (%),

*P*—Metal reserves of $WO_3$ (ton).

### 2.3.3 Determination of major parameters of resource reserves estimation

(1) Determination of ore block area

The ore block area can be read out directly from the graphic files of the computer in the total projection profile of the resource reserves estimation.

(2) Determination of horizontal thickness

The horizontal thickness of a single engineering is the sum of the continuous sample thickness which cut through the orebody in this project. The trench and tunnel sampling was mostly perpendicular to the orebody trend, because part of the terrain and geographic conditions that skew the orebody trend had to be considered. So, the horizontal thickness is calculated using the Sinα= horizontal thickness/the length of the sample in the sampling trench (α is the angle between the orebody trend and the trench trend). The horizontal thickness is the product of the representative length and the cotangent of the orebody's dip angle because of the shallow drilling and the straight hole, $h= (l/n)\mathrm{ctg}\beta$ (*h* is the horizontal thickness; l is the length of the ore core; *n* is the collection percentage; β is the dip angle of the orebody). The horizontal thickness of the ore block is the weighted average of every single engineering orebody in the ore block.

(3) Determination of average grade

The average grade of a single engineering is calculated by the weighted average of the continuous sample grade and the thickness in the project.

$$C= (C_1m_1+C_2m_2+\ldots\ldots+C_nm_n)/ (m_1+m_2+\ldots\ldots+m_n),$$

C is the average grade of the single engineering,

$C_1$, $C_2$, ..., $C_n$ are the grades of every sample in the engineering,

$m_1$, $m_2$, …, $m_n$ are the horizontal thicknesses of every sample.

The average grade of the ore block is calculated by the weighted average of every single engineering.

#### 2.3.4 Classification of type of resource reserve

The types of resource reserves are determined according to the degree of geological works. The type of resource reserve is 122b type, while the other is named 333 type if the deep network scale has more than two inner-ring ore blocks controlled by the exploration engineering quality points. The resource reserve is determined as 333 type, whatever has the ore blocks of the extrapolation points. The geological blocks of the orebody in the mining area are divided into seven as follows: I orebody (122b−1, 333−1, 333−2); Ⅱ orebody (333−1, the whole region 122b first block, 333 four block), respectively.

## 3 Description of data sample

The sample registration form (Table 2) for the Wayaokeng scheelite mining area contains the following: project number, sample number (field number, chemical examination number), sampling location (unit m), length of the sample (unit m), horizontal width of the orebody (unit m), method of sampling, type of ore (rock), analysis results ($WO_3$, Mo, Cu, Pb, Zn, Sn), grade segment of the orebody sample (grade %, orebody), remarks.

The calculation table (Table 3) of the top and floor coordinates and the thickness and ore grade of the orebody in a drilling single engineering of the Wayaokeng scheelite mining area contains the following: orebody number, project number, sample number (field number), sampling location (unit m), length of the sample (unit m), grade of the sample $WO_3$ (%), coordinate of the top ($X$, $Y$, $H$), coordinate of the floor ($X$, $Y$, $H$), orebody strike (unit degree), dip angle of the orebody (unit degree), true thickness (unit m), horizontal thickness (unit m), single engineering thickness (unit m), grade (%).

The calculation table (Table 4) of the average horizontal thickness and average ore grade of a drilling single engineering of the Wayaokeng scheelite mining area contains the following: orebody number, exploration line number, project number, field number, length of sample (m), quantity of the samples, total length of the samples (m), angle between the orientation of the trench and the orebody trend ($^o$), horizontal thickness (m), orebody strike ($^o$), orientation of the trench ($^o$), grade of single sample ($WO_3$, %), single engineering (sampling point) thickness (m), grade (%), remarks.

The calculation table (Table 5) of the average horizontal thickness and average ore grade of the orebody blocks of the Wayaokeng scheelite mining area contains the following: orebody number, block number, single engineering (sampling number) [including project (sample) number, horizontal thickness (m), $WO_3$ (%)], weighted grade ($WO_3$, %), the average ore block (thickness, $WO_3$ %), remarks.

The weight test results table (Table 6) for the Wayaokeng scheelite mining area contains the following: sample number, sampling position and weight test results of the orebody (t/$m^3$), $WO_3$ (%), entrusted testing department, remarks.

The estimation table (Table 7) of ore resource reserves for the Wayaokeng scheelite mining area contains the following: orebody number, type of resource reserves, ore block number, area of the ore block ($m^2$), average thickness (m), volume ($m^3$), the reduction stope out volume ($m^3$), actual volume ($m^3$), weight ($t/m^3$), ore reserves (t), grade (%), weight of the $WO_3$ metals (t), remarks.

The summary table (Table 8) of retained reserves for the Wayaokeng scheelite mining area contains the following: orebody number, types of the resource reserves, ore reserves (kt), average grade of $WO_3$ (%), weight of the $WO_3$ metals (t), remarks.

**Table 2 Sample registration table for the Wayaokeng scheelite mining area, Niedu, Chongyi**

| Number | Field name | Dimension | Data type | Examples |
|---|---|---|---|---|
| 1 | Engineering number | | Character type | 555D1 |
| 2 | Sample number | | Character type | |
| | Field number | | Character type | H1 |
| | Test number | | Character type | Y06−2383 |
| 3 | Sampling position | | Character type | |
| | From | m | Floating point | 0 |
| | To | m | Floating point | 2 |
| 4 | Length of sample | m | Floating point | 2 |
| 5 | Horizontal width of orebody | m | Floating point | |
| 6 | Sampling method | | Character type | Engraved groove |
| 7 | (Rock)ore type | | Character type | Skarn contained tungsten |
| 8 | Results of the analysis | % | Floating point | |
| | $WO_3$ | % | Floating point | 0.02 |
| | Mo | % | Floating point | 0.03 |
| | Cu | % | Floating point | 0.14 |
| | Pb | % | Floating point | 0.002 |
| | Zn | % | Floating point | 0.019 |
| | Sn | % | Floating point | 0.01 |
| 9 | Orebody sample section | | Character type | |
| | Grade | % | Floating point | |
| | Orebody | | Character type | |
| 10 | Remarks | | Character type | |

**Table 3 Standard table for coordinate and thickness of roof and floor of single drilling for the Wayaokeng scheelite mining area, Niedu, Chongyi**

| Number | Field name | Dimension | Data type | Examples |
|---|---|---|---|---|
| 1 | Orebody number | | Character type | I |
| 2 | Exploration line number | | Character type | line4 |
| 3 | Engineering number | | Character type | ZK401 |
| 4 | Field number | | Character type | H2 |
| 5 | Sampling position | | Floating point | |
| | From | m | Floating point | 3.5 |
| | To | m | Floating point | 5.5 |
| 6 | Length of sample | m | Floating point | 2 |
| 7 | Unit grade $WO_3$ | % | Floating point | 0.15 |
| 8 | Roof coordinate | | Floating point | |
| | X | | Floating point | 2822117 |
| | Y | | Floating point | 38510923 |
| | H | | Floating point | 552.4 |
| 9 | Floor coordinate | | Floating point | |
| | X | | Floating point | 2822117 |
| | Y | | Floating point | 38510923 |
| | H | | Floating point | 550.4 |
| 10 | Orebody tendency | ° | Floating point | 353 |
| 11 | Orebody inclination | ° | Floating point | 32 |
| 12 | True thickness | m | Floating point | 1.7 |
| 13 | Horizontal thickness | m | Floating point | 3.2 |
| 14 | Single engineering thickness grade | | Character type | |
| | True thickness | m | Floating point | |
| | Horizontal thickness | m | Floating point | 3.2 |
| | $WO_3$ | % | Floating point | 0.15 |

**Table 4 Single gauge ore body average horizontal thickness, average grade calculation table for the Wayaokeng scheelite mining area, Niedu, Chongyi**

| Number | Field name | Dimension | Data type | Examples |
|---|---|---|---|---|
| 1 | Orebody number | | Character type | I |
| 2 | Exploration line number | | Character type | 2W |
| 3 | Engineering number | | Character type | TC11 |
| 4 | Field number | | Character type | H87 |
| 5 | Length of sample | m | Floating point | 2 |
| 6 | Number of samples | | Floating point | 7 |
| 7 | Total length of samples | m | Floating point | 14 |
| 8 | Angle between the direction of the trench and the orebody | ° | Floating point | 58 |
| 9 | Horizontal thickness | m | Floating point | 11.80 |
| 10 | Orebody tendency | ° | Floating point | 332 |
| 11 | Orebody inclination | ° | Floating point | 72 |
| 12 | Orebody direction | ° | Floating point | 242 |
| 13 | Groove direction | ° | Floating point | 300 |
| 14 | Single sample grade $WO_3$ | % | Floating point | 0.15 |
| 15 | Single engineering (sampling position) thickness grade | | Character type | |
| | Horizontal thickness | m | Floating point | 11.8 |
| | $WO_3$ | % | Floating point | 0.389 |
| 16 | Remarks | | Character type | |

**Table 5 Average horizontal thickness and average grade calculation table of block orebody for the Wayaokeng scheelite mining area, Niedu, Chongyi**

| Number | Field name | Dimension | Data type | Examples |
|---|---|---|---|---|
| 1 | Orebody number | | Character type | I |
| 2 | Block number | | Character type | 122b−1 |
| 3 | Single engineering (or sampling position) | | Character type | |
| | Engineering (sample) number | | Character type | TC11 |
| | Horizontal thickness | m | Floating point | 11.8 |
| | $WO_3$ | % | Floating point | 0.389 |
| 4 | Weighted grade $WO_3$ | % | Floating point | 4.5902 |
| 5 | Ore block average | | Character type | |
| | Thickness | m | Floating point | 11.9 |
| | $WO_3$ | % | Floating point | 0.224 |
| 6 | Remarks | | Character type | |

**Table 6 Weight test results table for the Wayaokeng scheelite mining area, Niedu, Chongyi**

| Number | Field name | Dimension | Data type | Examples |
|---|---|---|---|---|
| 1 | Sample number | | Character type | D1 |
| 2 | Sampling position and orebody | | Character type | 561 median block 561D2 (I) |
| 3 | Weight test results | $T/m^3$ | Floating point | 2.57 |
| 4 | $WO_3$ | % | Floating point | 0.003 |
| 5 | Testing department entrusted | | Character type | Laboratory of 264 team, Nuclear Industry Geological Bureau |
| 6 | Remarks | | Character type | Regular wet wax method |

**Table 7 Estimates of ore body resource reserves for the Wayaokeng scheelite mining area, Niedu, Chongyi**

| Number | Field name | Dimension | Data type | Examples |
|---|---|---|---|---|
| 1 | Orebody number | | Character type | I |
| 2 | Type of resource reserves | | Character type | 122b |
| 3 | Ore block number | | Character type | 122b−1 |
| 4 | Ore block area | $m^2$ | Floating point | 1933 |
| 5 | Average thickness | m | Floating point | 11.9 |
| 6 | Volume | $m^3$ | Floating point | 23003 |
| 7 | The reduction stope out volume | $m^3$ | Floating point | 3000 |
| 8 | Actual volume | $m^3$ | Floating point | 23003 |
| 9 | Orebody weight | $T/m^3$ | Floating point | 2.84 |
| 10 | Ore reserves | t | Floating point | 56808 |
| 11 | Grade | % | Floating point | 0.224 |
| 12 | $WO_3$ metal amount | T | Floating point | 127.3 |
| 13 | Remarks | | Floating point | |

**Table 8 Summary of type for the Wayaokeng scheelite mining area, Niedu, Chongyi**

| Number | Field name | Dimension | Data type | Examples |
|---|---|---|---|---|
| 1 | Orebody number | | Character type | I |
| 2 | Type of resource reserves | | Character type | 122b |
| 3 | Ore reserves | kt | Floating point | 56.81 |
| 4 | Average grade of $WO_3$ | % | Floating point | 0.224 |
| 5 | Weight of $WO_3$ metals | T | Floating point | 127.3 |
| 6 | Remarks | | Character type | |

## 4 Quality control and assessment of the data

The major engineering points (ingoing eye, drilling, trench) of the mining area are measured according to the requirements of the national measurement standard, and combining the measurement with national coordinate points, the accuracy of which can meet the requirements of resource reserves estimation.

The split half method is used in the drilling ore core and a sample length of 2 m is used for continuous sampling, so that the drilling quality meets the requirement of the standard.

There are 33 external testing samples, accounting for 16% of the total number of samples, which were tested by and comparative analysis entrusted to the laboratory of the 264 team, Nuclear Industry Geological Bureau. In addition, 26 internal testing samples, accounting for 12.8% of the total number of samples were tested separately. The test results are basically accurate and reliable according to the comparison of basic analysis results and internal and external results. The qualified rate of external test is 91% and internal test is 96.1%, which basically meets the requirements of resource reserves estimation.

## 5 Conclusions

The resource reserves data set of the Wayaokeng scheelite mining area at Chongyi, Niedu, in Chongyi country, Jiangxi province include in total seven data tables (.doc format). The dataset can provide a reference for the assessment of the resource reserves of the same kind of surrounding deposits, and also have reference significance in the study of the conditions of the zonation and their classification.

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