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雄安新区白洋淀流域平原区 1∶50 000 水文地质数据集

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摘要：本数据集依托 2016 年中国地质调查局“白洋淀流域平原区 1∶50 000 水文地质调查”项目，在充分收集以往地质资料的基础上，开展了隶属雄安新区规划建设核心区域的安新县幅、雄县幅 1∶50 000 水文地质及专项生态环境地质调查工作，编制了标准的 1∶50 000 水文地质图及说明书，依照行业规范将此次调查获取的数据建立了 1∶50 000 水文地质调查成果数据集。本数据集包含 8 种数据类型，包含 895 个基础调查数据，22 个野外地质综合调查点数据，82 个地层岩性界限调查点数据，540 个水文地质调查点数据，22 个环境地质调查点数据，12 个钻孔基本情况数据，71 个抽水试验综合成果数据，2 200 个野外照片数据，共计 3 844 个数据。本数据集对认识白洋淀及周边区域水文地质条件，评价地下水资源，以及研究湿地生态功能退化等生态地质环境问题具有一定的参考意义。

关键词：雄安新区；白洋淀流域；水文地质；湿地生态；1∶50 000 数据集

数据服务系统网址：http://dcc.cgs.gov.cn

1 引言

白洋淀是华北平原最大的淡水湖泊和草本沼泽湿地，由太行山前的永定河和滹沱河冲积扇交汇处的扇缘洼地汇水形成，素有“华北之肾”的美誉。2017 年 4 月 1 日，中共中央、国务院决定以白洋淀为核心设立河北雄安新区，打造优美生态环境，构建蓝绿交织、清新明亮、水城共融的生态城市。

由于特殊的地理位置，白洋淀在涵养水源、缓洪滞沥、调节区域气候、维持物种多样性等方面发挥着重要作用（文丽青，2001）。近年来，在气候和人类活动的影响下，白洋淀流域面临入淀水量减少、地下水超采、地面沉降、淀区水体污染、湿地生态结构失衡等系列生态地质环境问题（李英华，2004；张素珍，2007；尹健梅等，2009）。在京津冀一体化的大趋势下，白洋淀作为京津冀区域乃至华北平原重要的生态环境变化

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“晴雨表”，其生态环境的变差也反映了区域生态安全和水安全的严峻程度。为缓解生态资源环境约束，推进生态文明建设，推动区域发展总体战略，急需加强白洋淀流域的水–工–环地质调查。从维护区域水安全和生态安全的角度出发，如何对白洋淀进行科学保护和修复，已成为当前亟待解决的关键问题。适时开展该区域的水文地质调查工作，对有效保护地质环境具有十分重要的意义，也为后期白洋淀生态环境科学保护和修复做好基础支撑工作。

本次国际标准图幅 1：50 000 水文地质调查工作区位于白洋淀区北侧，调查面积约 800 km^2（图 1）。

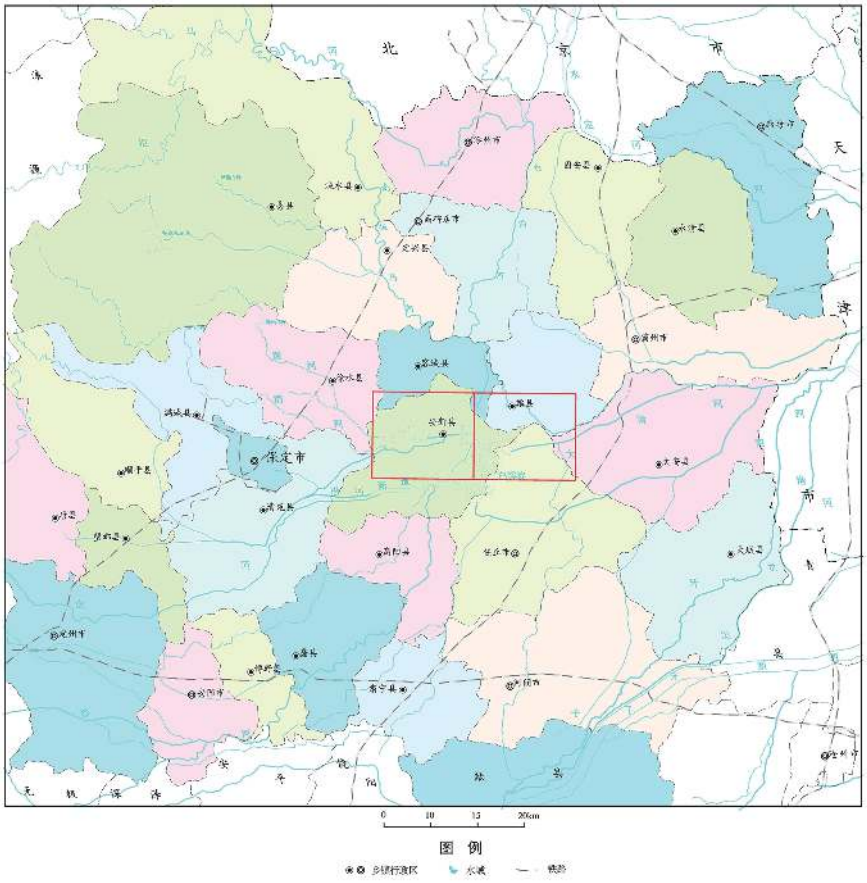


图 1　雄安新区白洋淀流域工作区交通位置图

本次调查工作的目的是，详细掌握研究区内微地貌特征、地下水系统结构、地下水补–径–排条件、地下水动态变化特征、地下水开发利用现状、地表水与地下水的相互关系等基础信息。

本数据集涵盖地质综合调查数据、地质岩性调查数据、水文地质调查数据、地质环境调查数据、钻孔数据、抽水试验数据和调查照片数据等各类数据（表 1）。本数据集对于科学评价白洋淀流域地下水资源及地下水质量，合理建立湿地生态水文地质监测网等，提供了基础数据支持；同时为区域水资源可持续利用研究和湿地生态修复实践提供了专业技术支撑。

表 1　数据库（集）元数据简表

条 目	描 述
数据库（集）名称	雄安新区白洋淀流域平原区1：50 000水文地质数据集
数据库（集）作者	张 源，中国地质环境监测院 赵 凯，中国地质环境监测院 李海涛，中国地质环境监测院 尤 冰，河北水文工程地质勘察院 王永波，河北水文工程地质勘察院 王世雄，河北水文工程地质勘察院
数据时间范围	2016年8月—2017年2月
地理区域	河北省保定市安新县、雄县
数据格式	*.accdb
数据量	1.8 MB
数据服务系统网址	http://dcc.cgs.gov.cn/
基金项目	地质大调查项目“白洋淀流域平原区1：50 000水文地质调查”（DD20160239）
语种	中文
数据库（集）组成	本数据集包含8种数据类型，包含895个基础调查数据，22个野外地质综合调查点数据，82个地层岩性界限调查点数据，540个水文地质调查点数据，22个环境地质调查点数据，12个钻孔基本情况数据，71个抽水试验综合成果数据，2 200个野外照片数据，共计3 844个数据。

2　数据采集和处理方法

本次水文地质调查工作采用资料收集、遥感解译、地球物理勘探、水文地质钻探、抽水试验、野外调查等多种工作手段完成（表 2）。

表 2　调查数据类型统计表

调查数据类型	数据个数
基础调查数据	895
野外地质综合调查点数据	22
地层岩性界限调查点数据	82
水文地质调查点数据	540
环境地质调查点数据	22
钻孔基本情况数据	12
抽水试验综合成果数据	71
野外照片数据	2 200

2.1　遥感解译数据集

水文地质遥感解译依据遥感数据信息，通过利用安装在 GF−1 卫星遥感平台上的各种电子或光学遥感器，在不与地面物体直接接触的情况下，所产生的波谱范围在 0.49 ~ 0.69 μm，分辨率为 2 m 的全色波谱图像，根据图像的几何形态、大小、色调、色彩、阴影等影像特征来直接判断地貌类型、地层岩性、地质构造等与水文地质条件密切相关的要素。

遥感解译首先利用已有准确地理坐标和投影信息的原始遥感影像进行几何纠正，再利用 DEM 高程数据对新获取的遥感影像进行纠正，消除地形起伏带来的影像变形，获取准确的地面坐标和投影信息，再对纠正后的遥感影像的图像色彩进行增强，使得不同的遥感数据具有不同的空间分辨率、波谱分辨率和时相分辨率。根据解译要素对调校后

的遥感图像建立解译标志，然后利用目视直接判断法对遥感图像上的各个地质特征进行判断标注；对特征不十分明显的要素通过野外实地调查予以验证。

2.2 地球物理勘探

根据需要解决的水文地质问题，考虑工作区的地球物理特征，本次工作利用激电测深法开展物探测量工作。

物探野外工作测量布设时，水平方向上的电偶极和磁探头相互垂直敷设，方位角偏差不大于 1°，水平磁棒距中心点 8 米以上；磁棒应水平放置，埋入地下 50 cm；电极入土 20 ~ 30 cm，观测视电阻率、相位随频率曲线连续无效频点不大于 3 个，相关度值大于 0.5，有效频点数大于 75%。测量检查点数不少于全测区坐标点的 3%，检查点与被检查点的全频视电阻率（ρxy）曲线和相位（φxy）曲线形态一致，对应频点的数值接近，且经编辑、插值后检查点与被检查点同一极化的均方相对误差（m）不大于 5%（即 m≤5%）。测量工作完成后，对测量数据进行检查、剔除、筛选，之后利用采集软件处理筛选过的时序资料。在数据解译时参照地层情况及钻孔资料，使解译成果质量进一步得到保证。

2.3 水文地质钻探

水文地质钻探主要用于直观了解掌握地下含水层特征，通过采集钻孔的岩土样品和水样品，并在钻孔内开展现场试验与测试工作，以获取需要的水文地质参数。

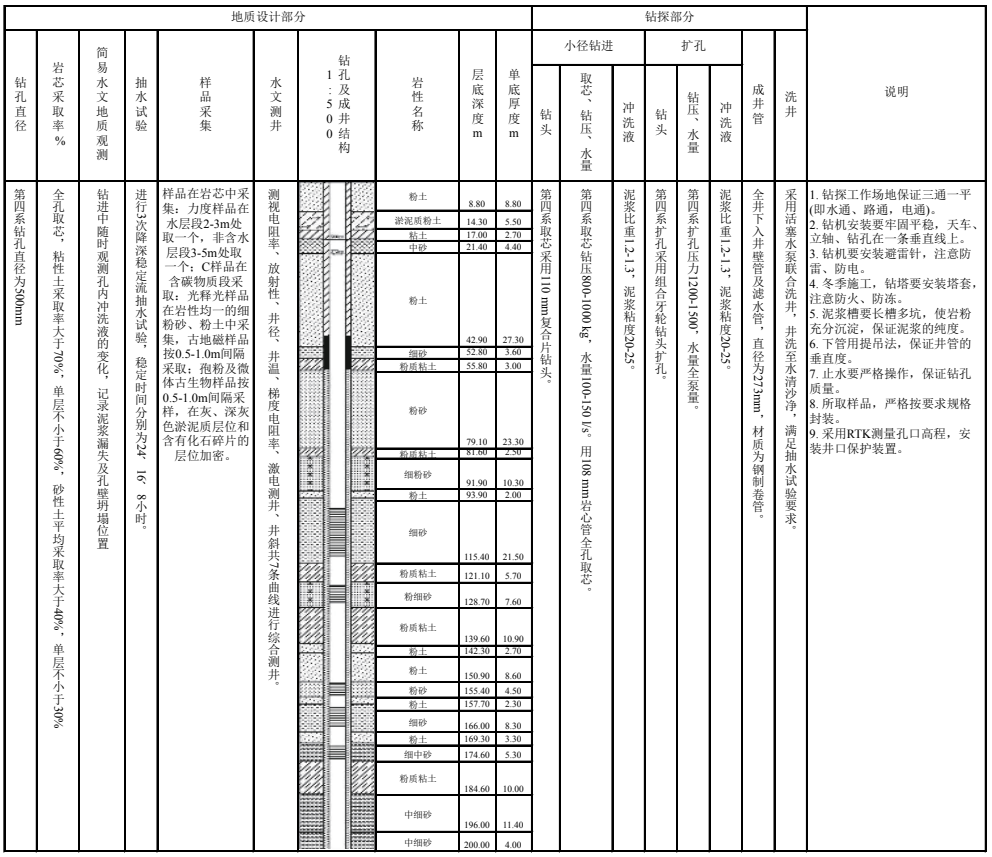
水文地质钻探采用正循环回转取心钻进，粘性土平均采取率均大于 70%，单层不少于 60%；砂性土、松散砂砾岩、基岩强烈风化带、破碎带平均采取率均大于 40%，单层不少于 30%。钻孔每钻进 50 m 测量孔斜及校正孔深一次，使其深度内孔斜小于 1.5 °，孔深误差不大于 2‰，并以校正后的孔深为准。随钻探工作进度及时进行钻孔地质编录；钻孔竣工后，进行物探测井及抽水试验，并编制钻孔地质柱状图（如图 2），测井曲线及抽水试验结果，最后采集地下水样并进行分析化验。

钻探地质编录根据岩心采取顺序由新到老进行分层编录描述，描述岩心的岩性、矿物成分、结构组分、生物化石、沉积构造、产状、孔隙裂缝、各种次生变化等特征。

钻孔测井包括自然伽马测井、自然电位测井和超声波成像测井三种方式。每次测井首先全井段测量井径，了解钻孔的井径变化及套管的完好情况，当井内有套管时，其测量值与已知井径值相差不超过±2 mm。井径曲线变化反映地层岩性硬度的变化；自然电位曲线能显示出渗透层位置；自然伽马曲线能计算地层泥质含量；超声波成像图像可以识别地层裂隙发育情况，确定裂隙倾向等。

2.4 抽水试验

抽水试验是为获取含水层和包气带的水文地质参数，为地下水资源评价提供基础数据。在分析已有水文地质钻孔和机（民）井抽水试验资料的基础上，根据参数空间分布特征，在参数控制不足地段开展抽水试验工作。抽水试验采用单孔稳定流法反向抽水，按三个落程进行，稳定时间分别为 24 h、16 h、8 h。当水量很小或水位下降不明显时，可作一次降深，但稳定时间不小于 24 h。当抽水孔水位不能稳定时，应进行一次最大降深的非稳定流试验。抽水延续时间视 s–lgt 曲线确定，一般应不小于 24 h。稳定流抽水试验在稳定时间内应达到涌水量和水位稳定，或在一定范围内波动，不得有持续下降或上升的趋势。水位波动范围的误差一般不能超过平均降深值的 1%，涌水量波动值不能超过平均流量的 3%。



地质设计部分										钻探部分							
										小径钻进			扩孔				
钻孔直径	岩芯采取率%	简易水文地质观测	抽水试验	样品采集	水文测井	钻孔及成井结构 1∶500	岩性名称	层底深度m	单底厚度m	钻头	取芯、钻压、水量	冲洗液	钻头	钻压、水量	冲洗液	成井管	洗井	说明
第四系钻孔直径为508mm	全孔取芯，粘性土采取率大于70%，单层不小于60%，砂性土平均采取率大于40%，单层不小于20%	钻进中随时观测孔内冲洗液的变化，记录泥浆漏失及孔壁坍塌位置	进行2次降深稳定流抽水试验，稳定时间分别为24、16、8小时。	样品在岩芯中采集：力度样品在水层段2-3m处取一个，非含水层段3-5m处取一个；C样品在含碳物质段采取；光释光样品在岩性均一的细粉砂、粉土中采集，古地磁样品按0.5-1.0m间隔采取；孢粉及微体古生物样品按0.5-1.0m间隔采样，在灰、深灰色淤泥质层位和含有化石碎片的层位加密。	测视电阻率、放射性、井径、井温、梯度电阻率、激电测井、井斜共7条曲线进行综合测井。		粉土	8.80	8.80	第四系取芯采用110 mm复合片钻头。	第四系取芯钻压800-1000 kg，水量100-150 l/s。用108 mm岩心管全孔取芯。	泥浆比重1.2-1.3，泥浆粘度20-25。	第四系扩孔采用组合牙轮钻头扩孔。	第四系扩孔压力1200-1500，水量全泵量。	泥浆比重1.2-1.3，泥浆粘度20-25。	全井下入井壁管及滤水管，直径为273mm，材质为钢制卷管。	采用活塞水泵联合洗井，井洗至水清沙净，满足抽水试验要求。	1. 钻探工作场地保证三通一平(即水通、路通，电通)。 2. 钻机安装要牢固平稳，天车、立轴、钻孔在一条垂直线上。 3. 钻机要安装避雷针，注意防雷、防电。 4. 冬季施工，钻塔要安装塔套，注意防火、防冻。 5. 泥浆槽要长槽多坑，使岩粉充分沉淀，保证泥浆的纯度。 6. 下管用提吊法，保证井管的垂直度。 7. 止水要严格操作，保证钻孔质量。 8. 所取样品，严格按要求规格封装。 9. 采用RTK测量孔口高程，安装井口保护装置。
							淤泥质粉土	14.30	5.50									
							粘土	17.00	2.70									
							中砂	21.40	4.40									
							粉土	42.90	27.30									
							细砂	52.80	3.60									
							粉质粘土	55.80	3.00									
							粉砂	79.10	23.30									
							粉质粘土	81.60	2.50									
							细粉砂	91.90	10.30									
							粉土	93.90	2.00									
							细砂	115.40	21.50									
							粉质粘土	121.10	5.70									
							粉细砂	128.70	7.60									
							粉质粘土	139.60	10.90									
							粉土	142.30	2.70									
							粉土	150.90	8.60									
							粉砂	155.40	4.50									
							粉土	157.70	2.30									
							细砂	166.00	8.30									
							粉土	169.30	3.30									
							细中砂	174.60	5.30									
							粉质粘土	184.60	10.00									
							中细砂	196.00	11.40									
							中细砂	200.00	4.00									

图 2　典型地质钻孔柱状图

图注：典型地质钻孔柱状图用于实际施工前预判施工过程中可能遇到的地质问题

2.5　野外水文地质调查

野外水文地质调查的主要内容是，调查与水资源和地下水相关的人为活动，同时调查污染源，并完成采集水样等系列工作。通过对地质、地貌、地下水点及其他与地下水有关的各种现象的观察、访问和描述进行综合研究，找出它们之间的内在联系，查明地下水埋藏、分布。水文地质工作的主要目的如下：

（1）调查浅层水文地质条件，查清浅层地下水的补−径−排条件，以及浅层地下水动态规律；

（2）调查地下水的现状开采方式、开采量、供水对象；

（3）调查城镇、工矿企业、农田集中区的空间分布；

（4）调查污染源、污染途径、地表水与地下水的污染程度。

在调查过程中，着重调查地层界线、断层线、地貌分界线、自然地质现象发育处、井、泉、钻孔、地表水体和重要水利工程等，并采用数码摄影、摄像、素描图等手段，记录地质地貌、水文地质等现象，并现场测试采集水样的色−味−嗅、温度、pH 值、电导率、氧化还原电位、溶解氧等指标。最后将调查数据记录在野外调查记录本和表格上，并将所有数据资料录入调查系统数据库中。

3　数据样本描述

“雄安新区白洋淀流域平原区 1∶50 000 水文地质数据集”有 8 种数据类型，包含“雄安新区白洋淀流域平原区 1∶50 000 水文地质数据集基础调查数据属性表”、“雄

安新区白洋淀流域平原区 1：50 000 水文地质数据集野外地质综合调查点数据属性表”、“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集地层岩性界限调查点数据属性表”、“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集水文地质调查点数据属性表”、“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集环境地质调查点数据属性表”、“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集钻孔基本情况数据属性表”、“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集抽水试验综合成果数据属性表”、“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集野外照片数据属性表”，共计 3 844 个数据属性表。

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集基础调查数据属性表”包含如下内容：统一编号、野外编号、经纬度（°）、平面坐标（X、Y）、地面高程、地理位置、图幅编号、调查点类型等，如表 3 所示。

表 3　雄安新区白洋淀流域平原区 1：50 000 水文地质数据集基础调查数据属性表

序号	字段名称	量纲	数据类型	实例
1	统一编号	–	字符型	1150306273857170000
2	野外编号	–	字符型	XXDC6-005
3	经 纬 度	°	浮点型	经度：115030627；纬度：38571700
4	平面坐标	–	浮点型	X坐标：315290.79823685；Y坐标：20331115.148791
5	地面高程	m	浮点型	6.0
6	地理位置	–	字符型	河北省雄市（县）雄州镇（乡）古庄头村北大堤北侧
7	图幅编号	–	字符型	雄县幅J50E007009
8	调查点类型	–	字符型	地质综合调查点

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集野外地质综合调查点属性表”包含如下内容：统一编号、地貌与地质特征、水文地质特征、环境地质特征、访问及沿途特征、测点间关系特征、人工地质剖面示意图（图片）、调查点平面图（图片）、照片编号、调查单位、调查人、调查时间（年月日）、记录人、审核人等，如表 4 所示。

表 4　雄安新区白洋淀流域平原区 1：50 000 水文地质数据集野外地质综合调查点属性表

序号	字段名称	量纲	数据类型	实例
1	统一编号	–	字符型	1154745903851164401
2	地貌与地质特征	–	字符型	调查点位于冲洪积平原，调查点处为人工堤，堤上宽3米，下宽5米，高约3米，调查点东侧为沟渠，沟渠内有水宽3米，深约0.5米，渠东侧为淀区；堤顶为土路，堤西侧高约0.2米的人工填土，由于常走形成土路，点西北有一房屋；土路西侧有高约0.2米小树林，树林西侧为农田，种植玉米；再西侧为宽约4米，深约2米的河渠，其中水深1米；沟渠西侧为农田。调查点处为第四纪全新世冲洪积物，东侧沟渠出露岩性自上而下为：0~0.5米粉质粘土，黄褐色；0.5~1.5米粉质粘土，黄褐色。西侧沟渠出露岩性自上而下为0~1米粉质粘土，黄褐色。
3	水文地质特征	–	字符型	包气带含水层为主要利用含水层。
4	环境地质特征	–	字符型	土地利用类型主要为农作物植被用地。

续表 4

序号	字段名称	量纲	数据类型	实例
5	访问及沿途特征	–	字符型	由测点AXDC 2-004到测点AXDC 2-005，途中地势较平坦，有略微起伏，多为农田，沿途看见人工开挖的深沟，走向为北西，沟底坡度向东南倾斜。
6	测点间关系特征	–	字符型	由上一测点到此测点，途中地势较平坦，多为农田和村庄。
7	人工地质剖面示意图（图片）	–	长二进制数据	（图片）
8	调查点平面图（图片）	–	长二进制数据	（图片）
9	照片编号	–	浮点型	AXDC 01-069
10	调查单位	–	字符型	中国地质环境监测院
11	调查人	–	字符型	赵凯 王凯霖
12	调查时间（年.月.日）	Y.M.D	字符型	2016.8.1
13	记录人	–	字符型	王凯霖
14	审核人	–	字符型	赵凯

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集地层岩性界限调查点属性表”包含如下内容：统一编号、野外编号、路线野外编号、经度（°）、纬度（°）、X 坐标、Y 坐标、地面高程、地理位置、图幅编号、地貌类型、照片编号、界线上两地层特征、接触关系、周围环境状况、点间关系、剖面示意图（图片）、平面位置示意图（图片）、备注、项目名称、调查单位、调查日期（年.月.日）、调查人、记录人、审核人等，如表 5 所示。

表 5　雄安新区白洋淀流域平原区 1：50 000 水文地质数据集地层岩性界限调查点属性表

序号	字段名称	量纲	数据类型	实例
1	统一编号	–	字符型	11612192738593900000
2	野外编号	–	浮点型	XXDC7-001
3	路线野外编号	–	浮点型	16
4	经度	–	浮点型	116121927
5	纬度	–	浮点型	38593960
6	X坐标	–	浮点型	4318175.31
7	Y坐标	–	浮点型	20431156.61
8	地面高程	–	浮点型	7
9	地理位置	–	字符型	河北省雄县张岗镇南庄子村南500m
10	图幅编号	–	字符型	雄县幅J50E007009
11	地貌类型	–	字符型	堆积平原新冲积平原亚区
12	照片编号	–	浮点型	P19# 520-2176-2178
13	界线上两地层特征	–	字符型	调查点为岩性界限点，点北为粉质粘土（Q_{4al+pl}），黄褐色；点南为砂质粉土(Q_{4al})，浅黄褐色，由南向北岩性渐变，砂质粉土含砂量由点处向南至河中心带逐渐增多。
14	接触关系	–	字符型	沉积接触
15	周围环境状况	–	字符型	调查点位于河道中（全新世古河道），河道宽约1400m，两侧有人工堤，河道内地势平坦，近堤处较洼（取土），调查点地貌类型为堆积平原新冲积平原亚区。

续表 5

序号	字段名称	量纲	数据类型	实例
16	点间关系	–	字符型	点附近多年没水，已人工改为耕地，点北多种植玉米，点南侧多种植红薯。
17	剖面示意图（图片）	–	长二进制数据	（图片）
18	平面位置示意图（图片）	–	长二进制数据	（图片）
19	备注	–	字符型	调查点位于南拒马河古河道
20	项目名称	–	字符型	白洋淀流域安新幅、雄县幅1：50 000水文地质调查
21	调查单位	–	字符型	河北省水文工程地质勘察院
22	调查日期（年.月.日）	Y.M.D	字符型	2016.9.20
23	调查人	–	字符型	王世雄 郭凯华
24	记录人	–	字符型	王世雄
25	审核人	–	字符型	王玉蛟

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集水文地质调查点属性表”包含如下内容：统一编号、取样情况、地形地貌特征、地下水类型、测点类型、井结构、井深（m）、水位埋深（m）、取水层段、水井用途、地下水特征（水温、色–味–嗅、浊度、矿化度、Eh、EC、DO、pH、TDS）、照片编号、调查单位、调查人、调查时间（年.月.日）、记录人、审核人等，如表 6 所示。

表 6　雄安新区白洋淀流域平原区 1：50 000 水文地质数据集水文地质调查点属性表

序号	字段名称		量纲	数据类型	实例
1	统一编号		–	字符型	1154527163850286901
2	取样情况		–	字符型	全分析水样
3	地形地貌特征		–	字符型	平原
4	地下水类型		–	字符型	潜水
6	测点类型		–	字符型	机井
7	井结构		–	字符型	水泥管
8	井深		M	浮点型	340
9	水位埋深		M	浮点型	28.46
10	取水层段		M	浮点型	230-300
11	水井用途		–	字符型	农牧业
12	地下水特征	水温	℃	浮点型	14.8
		色–味–嗅	–	字符型	无色无味
		浊度	–	字符型	透明
		矿化度	mg/L	浮点型	112
		Eh	mV	浮点型	74.7
		EC	mS/cm	浮点型	541
		DO	mg/L	浮点型	7.18
		pH	–	浮点型	8.23
		TDS	mg/L	浮点型	424.3
13	照片编号		–	字符型	AXDC 01-004

续表 6

序号	字段名称	量纲	数据类型	实例
14	调查单位	–	字符型	中国地质环境监测院
15	调查人	–	字符型	赵凯 王凯霖
16	调查时间（年.月.日）	Y.M.D	字符型	2016.7.10
17	记录人	–	字符型	王凯霖
18	审核人	–	字符型	赵凯

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集环境地质调查点属性表”包含如下内容：统一编号、野外编号、图幅编号、经度、纬度、地理位置、地面高程、固体废弃物种类、占地类型、堆放体形状、占地修复难度、地层岩性描述、地貌、地形坡度、地表岩性、补给类型、泉水排泄、天气、气温、堆埋方式、堆置状态、防渗措施、与居民点距离、与地表水距离、与旅游胜地重要设施距离、场地稳定性、与城市区距离、平面示意图、剖面示意图、备注、项目名称、调查单位、调查日期、调查人、记录人、审核人，如表 7 所示。

表 7　雄安新区白洋淀流域平原区 1：50 000 水文地质数据集环境地质调查点属性表

序号	字段名称	量纲	数据类型	实例
1	统一编号	–	浮点型	11547105538511500000
2	野外编号	–	浮点型	AXDC01-070
3	图幅编号	–	字符型	安新幅J50E007008
4	经 度	°	浮点型	115471055
5	纬 度	°	浮点型	38511590
6	地理位置	–	字符型	河北省保定市安新县安州镇新立庄村
7	地面高程	m	浮点型	7
8	固体废弃物种类	–	字符型	生活、工业
9	占地类型	–	字符型	弃坑
10	堆放体形状	–	字符型	不规则
11	占地修复难度	–	字符型	易
12	地层岩性描述	–	字符型	第四系黏土
13	地 貌	–	字符型	平原
14	地形坡度	°	浮点型	<8
15	地表岩性	–	字符型	粘性土
16	补给类型	–	字符型	降水,地表水
17	泉水排泄	–	字符型	无
18	天 气	–	字符型	阴
19	气 温	℃	浮点型	28
20	堆埋方式	–	字符型	简单填埋
21	堆置状态	–	字符型	进行
22	防渗措施	–	字符型	无
23	与居民点距离	m	浮点型	<500
24	与地表水距离	m	浮点型	<800

续表 7

序号	字段名称	量纲	数据类型	实例
25	与旅游胜地重要设施距离	km	浮点型	>10
26	场地稳定性	–	字符型	稳定
27	与城市区距离	km	浮点型	>15
28	平面示意图	–	长二进制数据	(图片)
29	剖面示意图	–	长二进制数据	(图片)
30	备 注	–	字符型	点处为港安再生资源和尚上方再生资源有限公司，主要收购加工废旧电缆，安州镇及周边废旧电缆回收主要送往这里，场房四周有白洋淀专门供水的沟渠
31	项目名称	–	字符型	白洋淀流域安新幅、雄县幅1：50 000水文地质调查
32	调查单位	–	字符型	中国地质环境监测院
33	调查日期	Y.M.D	字符型	2016.8.7
34	调查人	–	字符型	赵凯 王凯霖 高羽
35	记录人	–	字符型	王凯霖
36	审核人	–	字符型	赵凯

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集钻孔基本情况属性表”包含如下内容：统一编号、地理位置、图幅编号、孔口高程（m）、地面高程、钻机类型、钻孔类型、开孔日期、终孔日期、井斜（°）、开孔直径（m）、终孔直径（m）、终孔深度（m）、含水层初见水位（m）、静止水位（m）、取样情况、机长、地质编录人、调查时间（年月日）、审核人等，如表 8 所示。

表 8　雄安新区白洋淀流域平原区 1：50 000 水文地质数据集钻孔基本情况属性表

序号	字段名称	量纲	数据类型	实例
1	统一编号	–	字符型	1160130313834283801
2	地理位置	–	字符型	雄州镇铭钏温泉水上乐园
3	图幅编号	–	字符型	J50E007009
4	孔口高程	m	浮点型	8.55
5	地面高程	m	浮点型	8.05
6	钻机类型	–	字符型	GY-150
7	钻孔类型	–	字符型	第四纪松散孔
8	开孔日期	–	字符型	2016.11.12
9	终孔日期	–	字符型	2016.11.19
10	井斜	°	浮点型	0.35
11	开孔直径	cm	浮点型	110
12	终孔直径	cm	浮点型	550
13	终孔深度	m	浮点型	151.65
14	含水层初见水位	m	浮点型	15
15	静止水位	m	浮点型	13
16	取样情况	–	字符型	全分析水样
17	机长	–	字符型	张正涛

续表 8

序号	字段名称	量纲	数据类型	实例
18	地质编录人	–	字符型	刘吉
19	调查时间	Y.M.D	字符型	2016.9.10
20	审核人	–	字符型	郭潇

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集抽水试验综合成果属性表”包含如下内容：统一编号、抽水试验编号、抽水试验类型、抽水试验设备、开始时间、第 1 落程延续时间、第 1 落程稳定时间、第 1 落程水位降升（m）、第 1 落程涌水量（m^3）、水位恢复时间、抽水前静止水位（m）、抽水后静止水位（m）、试验总延续时间（h）、最大单位涌水量（m^3）、调查单位、调查人、调查时间（年月日）、记录人、审核人等，如表 9 所示。

表 9　雄安新区白洋淀流域平原区 1：50 000 水文地质数据集抽水试验综合成果属性表

序号	字段名称	量纲	数据类型	实例
1	统一编号	–	字符型	11555506738565952O1
2	抽水试验编号	–	浮点型	AXDC 1-056
3	抽水试验类型	–	字符型	单孔抽水试验
4	抽水试验设备	–	字符型	三吋潜水泵
5	开始时间	–	字符型	2016.10.19
6	第1落程延续时间	′	浮点型	720
7	第1落程稳定时间	′	浮点型	300
8	第1落程水位降升	m	浮点型	9.5
9	第1落程涌水量	m^3	浮点型	7.65
10	水位恢复时间	–	浮点型	390
11	抽水前静止水位	m	浮点型	29.9
12	抽水后静止水位	m	浮点型	29.9
13	试验总延续时间	h	字符型	全分析水样
14	最大单位涌水量	m^3	字符型	P16-108-1502-1504
15	调查单位	–	字符型	中国地质环境监测院
16	调查人	–	字符型	王光普 郭凯华
17	调查时间（年.月.日）	Y.M.D	字符型	2016.5.10
18	记录人	–	字符型	郭凯华
19	审核人	–	字符型	王世雄

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集野外照片属性表”包含如下内容：统一编号、拍照时间、照片类型、照片等，如表 10 所示。

表 10　雄安新区白洋淀流域平原区 1:50 000 水文地质数据集野外照片属性表

序号	字段名称	量纲	数据类型	实例
1	统一编号	–	浮点型	1160656810852160000
2	拍照时间	Y.M.D hh:mm:ss	字符型	2016/9/24 13:48:24
3	照片类型	–	字符型	地层岩性界线调查点记录表
4	照 片	–	长二进制数据	(图片)

4 数据质量控制

工作区内开展的所有工作手段均依照国家行业规范《水文地质调查规范（1：50 000）》执行，所产生的数据表均依照规范附表执行，精度满足水文地质调查工作的规范要求。

工作区内的调查数据表 100% 开展自检和互检，数据表整理完成后已经完成了 15% 抽检，抽查结果显示的质量可信度满足水文地质调查工作的规范要求。

5 结论

白洋淀流域平原区 1：50 000 水文地质调查项目依照 DZ/T0282−2015《水文地质调查规范（1：50 000）》开展安新县幅和雄县幅水文地质调查工作，在调查成果的基础上，进行集成研究，并编录汇集“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集”，数据集共有 8 种数据类型，包含 895 个基础调查数据，22 个野外地质综合调查点数据，82 个地层岩性界限调查点数据，540 个水文地质调查点数据，22 个环境地质调查点数据，12 个钻孔基本情况数据，71 个抽水试验综合成果数据，2 200 个野外照片数据，共计 3 844 个数据（.accdb 格式）。

“雄安新区白洋淀流域平原区 1：50 000 水文地质数据集”的建立，为未来雄安新区规划建设的水文地质条件提供了详实的科学数据支撑，同时也为今后更准确地认识白洋淀流域地下水系统结构、地下水补−径−排条件、地下水动态变化特征等具有积累和重要的参考意义，同时该数据集的建立，也完善了国家基本比例尺水文地质数据库系统，为充分展示我国近年来的水文地质调查水平提供了一套基础性的数据资源，为最大限度的满足其他科研人员对该区域水文地质数据信息的查询需求，为实现信息资源共享创造了条件。为实现基础性、公益性地质调查工作成果的社会共享奠定基础（庞建峰，2017）。

致谢：“雄安新区白洋淀流域平原区 1：50 000 水文地质调查”项目的实施，得到中国地质调查局水环部郝爱兵主任、吴爱民副主任，以及荷兰联合国教科文组织国际水教育学院周仰效教授的大力支持，在此深表谢意。同时感谢河北省地矿局刘志刚总工、田文法处长等水文地质专家为项目组提供了大量技术指导，感谢协作单位河北水文地质工程勘察院为本项目提供了大量的调查研究资料，感谢项目承担单位中国地质环境监测院给予的一贯支持。

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Dataset of the 1∶50 000 Hydrogeological Map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area

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Abstract: This 1∶50 000 hydrogeological survey dataset was created as a result of the CGS (China Geological Survey) project "Hydrogeological Survey (1∶50 000) of the Plain Area of the Baiyangdian Lake Basin"in 2016, building on previously collected geological information. It was prepared in accordance with industrial specifications, using data acquired through this survey by conducting a 1∶50 000 hydrogeological and specifically eco-environmental geological survey in the Anxin and Xiong Counties, both located within the core planning and building region of Xiongan New Area, and by preparing a standard 1∶50 000 hydrogeological map with instructions for its use. This dataset has 8 types of data, including 895 basic survey data, 22 data from combined geological field survey points, 82 data from stratum lithological boundary survey points, 540 data from hydrogeological survey points, 22 data from environmental geological survey points, 12 data on basic information from drilled boreholes, 71 data from comprehensive results of pumping tests and 2 200 data from field pictures, in total 3 844 data. This dataset has implications as a reference work that are critical to understanding hydrogeological conditions in Baiyangdian Lake and its surroundings, evaluating groundwater resources and investigating problems relating to the eco-geological environment, such as degradation of wetland ecological functions.

Key words: Xiongan New Area; Baiyangdian Lake Basin; Hydrogeological; Wetland ecology; 1∶50 000 dataset

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

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1 Introduction

Baiyangdian Lake is the largest freshwater lake and herbal marsh wetland in the North China Plain, formed by water catchment in the fan-fringe depression at the meeting point of the Yongding River and the Hutuo River in the piedmont of the Taihang Mountains, known as the "Kidney of North China". On April 1, 2017, the CPC Central Committee and the State Council decided to establish the Hebei Xiongan New Area around Baiyangdian Lake, in order to create a wonderful ecosystem and build fresh and bright ecological cities where blue and green interweaves, and water and urban areas are integrated.

Owing to its special geographical location, Baiyangdian Lake plays an important role in conserving water resources, alleviating floods and delaying leaching, regulating the regional climate and maintaining species diversity (Wen LQ, 2001). In recent years, affected by climate and human activities, the Baiyangdian Lake basin has faced a series of ecological, geological and environmental challenges, such as reduced inflow, excessive extraction of groundwater, ground subsidence, water pollution and an unbalanced ecological structure in its wetland (Li YH, 2004; Yin JM et al., 2009; Zhang SZ, 2007). Under the grand trend of integration of Beijing, Tianjin and Hebei, as a barometer showing changes in the ecological environment of the Beijing−Tianjin−Hebei region and even the North China Plain, Baiyangdian Lake's eco-environmental deterioration also reflects how fragile ecological security and water security are within the region. To mitigate constraints to the ecosystem, resources and environments, promote the establishment of a stable ecology and carry out the overall development strategy for the region, it is imperative to further investigate water engineering and environmental geology in the Baiyangdian Lake Basin. From the perspective of maintaining regional water and ecological security, finding scientific means to protect and restore Baiyangdian Lake has become a crucial issue that requires urgent solutions. Conducting a hydrogeological survey in the region at the right time is not only very important in order to effectively preserve the geological environment, but also to provide basic support for the scientific protection and restoration of Baiyangdian Lake's ecological environment in the future.

The survey working area for this international standard 1∶50 000 hydrogeological map is about 800 km^2, located on the north side of Baiyangdian Lake (see Fig. 1).

The objective of this survey is to understand in detail basic information such as micro-topographical features, groundwater system structure, groundwater recharge, runoff and discharge conditions, groundwater dynamic change features, the current status of groundwater development and exploitation, as well as correlation between surface water and groundwater within the working area.

The dataset covers a variety of data types, including those compiled from geological survey, geological lithological survey, hydrogeological survey, geological environmental survey, drilling, pumping tests and photographs taken during the survey (see Table 1). This dataset not only provides basic data to support the scientific evaluation of groundwater resources and quality within the Baiyangdian Lake Basin, building a reasonable wetland ecological and hydrogeological monitoring network, but also gives specialized technical

support to both research concerned with the sustainable exploitation of water resources and practices to restore the wetland ecology in the region.

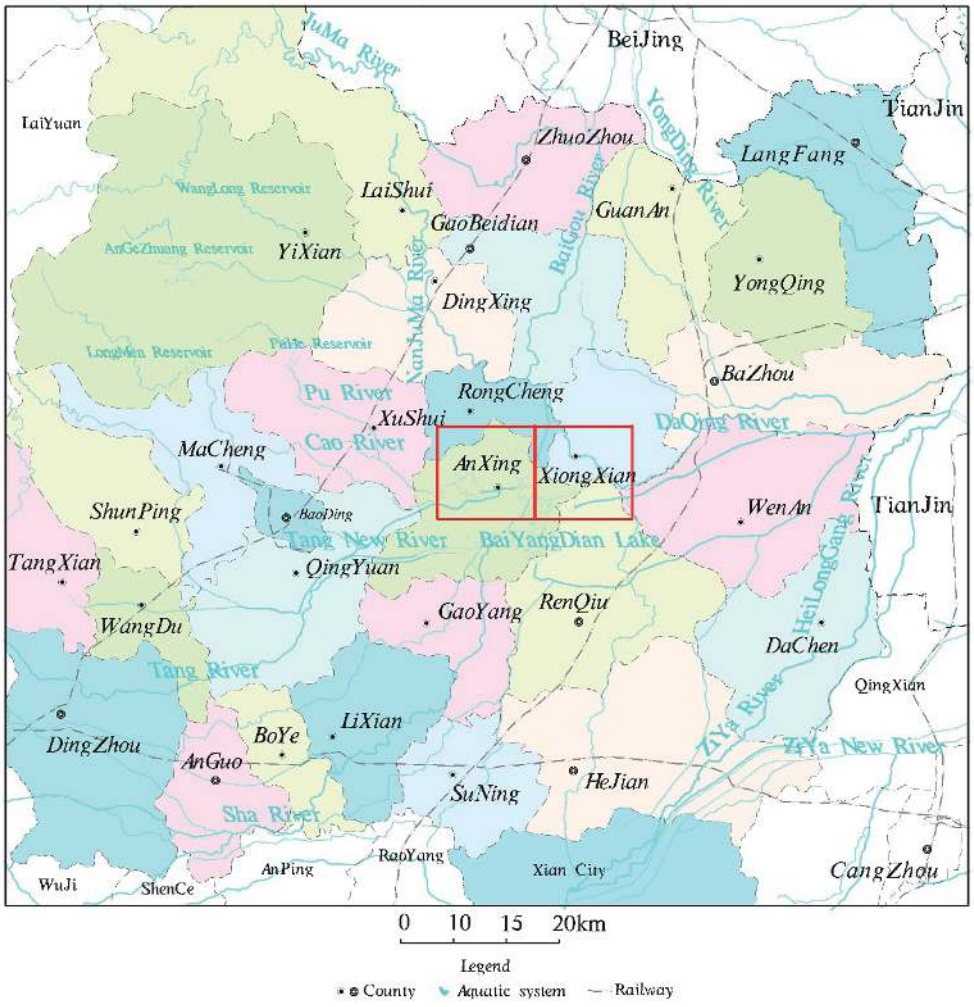


Fig. 1 Geographic location map of the working area of the Baiyangdian Lake Basin, Xiongan New Area

Table 1 Metadata table of database (dataset)

Items	Description
Database (dataset) name	Dataset of the 1∶50 000 Hydrogeological Map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area
Database (dataset) authors	Zhang Yuan, China Institute for Geo-environmental Monitoring Zhao Kai, China Institute for Geo-environmental Monitoring Li Haitao, China Institute for Geo-environmental Monitoring You Bing, Hebei Hydrological Engineering Geological Exploration Institute Wang Yongbo, Hebei Hydrological Engineering Geological Exploration Institute Wang Shixiong, Hebei Hydrological Engineering Geological Exploration Institute
Data acquisition time	Aug. 2016 — Feb. 2017
Geographica region	Anxin County and Xiong County, Baoding City, Hebei Province
Data format	*accdb

Continued table 1

Items	Description
Data size	1.8 MB
Data service system URL	http://dcc.cgs.gov.cn/
Fund project	CGS'grand geological survey project "Hydrogeological Survey (1∶50 000) on the Plain Area of the Baiyangdian Lake Basin" (DD20160239)
Language	Chinese
Database (dataset) composition	This dataset has 8 types of data including 895 basic survey data, 22 data from combined geological field survey points, 82 data from stratum lithological boundary survey points, 540 data from hydrogeological survey points, 22 data from environmental geological survey points, 12 data on basic information from drilled boreholes, 71 data from comprehensive results of pumping tests and 2 200 data from field pictures, in total 3 844 data.

2 Data Acquisition and Processing

Several methods, such as information collection, remote-sensing interpretation, geophysical exploration, hydrogeological drilling, pumping test and field survey, were used in this hydrogeological survey (see Table 2).

Table 2 Table of the category of surveyed data

Category of surveyed data	Number of data
Data from basic survey	895
Data from combined geological field survey points	22
Data from stratum lithological boundary survey points	82
Data from hydrogeological survey points	540
Data from environmental geological survey points	22
Data on basic information from drilled boreholes	12
Data from comprehensive results of pumping tests	71
Data from field pictures	2 200

2.1 Dataset from Remote-Sensing Interpretation

Hydrogeological remote-sensing interpretation is based on remote-sensed data and information. Full color spectral images with a resolution of 2 m and in the spectral range of 0.49~0.69 μm were generated by various electronic or optical remote sensors installed on the remote-sensing platform of satellite GF-1, without direct contact with surface objects, and were then used to directly determine elements closely related to hydrogeological conditions, such as topographic type, stratum lithology and geological structure, based on image features such as image geometry, size, hue, color and shadow.

For remote-sensing interpretation, the original remote-sensed images with accurate geographical coordinates and projection information were first used to make geometrical corrections; DEM elevation data were then used to correct newly-acquired remote-sensed images to eliminate image distortion due to landform topographic irregularities, in order to obtain accurate surface coordinates and projection information. Finally, the corrected remote-sensed images were enhanced for their color, so that different remote-sensed data had different

spatial resolution, spectral resolution and time-phase resolution. Based on the elements for interpretation, interpretation marks were made on the corrected and adjusted remote-sensed images, then, using visual direction judgment, various geological features in the remote-sensed images were determined and marked. For those elements without marked features, field survey was performed for verification.

2.2 Geophysical Prospecting

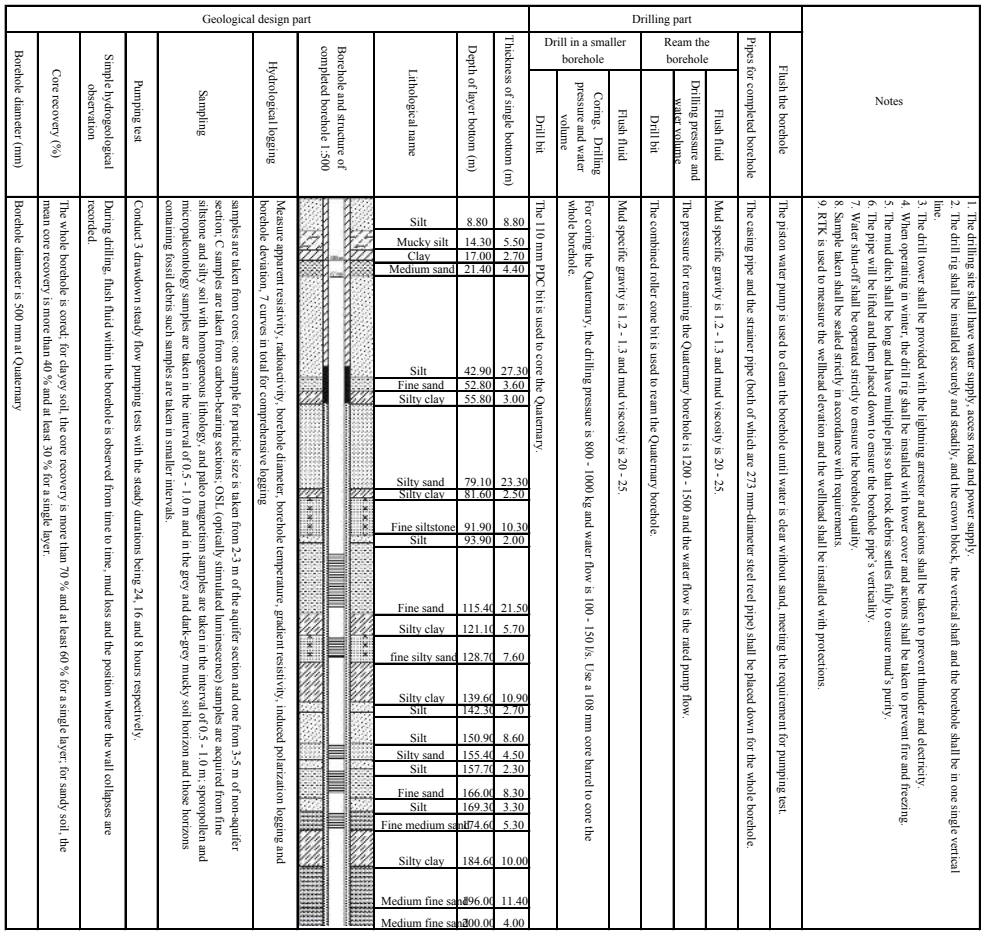
Considering the hydrogeological problems to be solved and the geophysical features within the working area, induced polarization sounding was used for measurements required for geophysical prospecting.

When deploying field geophysical prospecting work for measurement, the electric dipole and the magnetic probe in a horizontal direction are laid perpendicular to each other, with the deviation between their orientations no greater than 1°, and with the horizontal magnetic rods at least 8 m from the central points. Magnetic rods were placed horizontally at a depth of 50 m underground, with the electrodes 20~30 cm underground. There was at most 3 continuously failed frequency points when observing the apparent resistivity and the phase versus frequency curve, the correlation value was more than 0.5 and the number of successful frequency points accounted for 75%. The measured survey points constituted at least 3% of the total coordinate points throughout the area, the full frequency apparent resistivity (ρ_{xy}) curve and the phase (φ_{xy}) curve at the survey point was consistent with those at the surveyed point, the numerical values of the corresponding frequency points were similar and after editing and interpolation, the relative square error (m) between the survey point and the surveyed point, both of which were polarized in the same mode, was no greater than 5% (i.e. m $\leqslant$ 5%). After measurement, the measured data were checked and screened, with some data being removed after the screened timing data were processed with the acquisition software. When interpreting data, data on stratum and drilled boreholes were referenced to further ensure the quality of the interpreted results.

2.3 Hydrogeological Drilling

Hydrogeological drilling is mainly used to directly understand features of underground aquifers and aims at acquiring necessary hydrogeological parameters by acquiring rock, soil and water samples during drilling and conducting tests in boreholes.

Normal circulation core drilling is used in hydrogeological drilling; for clayey soil, the mean core recovery is over 70% and at least 60% for a single layer; for sandy soil, loose sand gravel stone, highly weathered zones in bedrocks and fractured zones, the mean core recovery is over 40% and at least 30% for a single layer. The borehole was measured for deviation and corrected for depth for every 50 m drilled, in order to maintain borehole deviation below 1.5° over the depth and with a depth error less than 2‰, subject to the corrected borehole depth. Geological recording for the borehole was performed while the drilling was in progress. After the borehole was completed, geophysical logging and pumping tests were conducted; the borehole geological histogram, logging curve and the results from the pumping test were prepared (see Fig. 2), and finally groundwater samples were taken for analysis.



Geological design part							Drilling part							
Thickness of single bottom (m)	Depth of layer bottom (m)	Lithological name	Borehole and structure of completed borehole 1:500	Hydrological logging	Sampling	Pumping test	Simple hydrogeological observation	Core recovery (%)	Borehole diameter (mm)	Drill in a smaller borehole: Drill bit	Drill in a smaller borehole: Coring, Drilling pressure and water volume	Drill in a smaller borehole: Flush fluid	Ream the borehole: Drill bit	Ream the borehole: Drilling pressure and water volume	Ream the borehole: Flush fluid	Pipes for completed borehole	Flush the borehole	Notes
8.80	8.80	Silt		Measure apparent resistivity, radioactivity, borehole diameter, borehole temperature, gradient resistivity, induced polarization logging and borehole deviation, 7 curves in total for comprehensive logging	samples are taken from cores: one sample for particle size is taken from 2-3 m of the aquifer section and one from 3-5 m of non-aquifer section; C samples are taken from carbon-bearing sections; OSL (optically stimulated luminescence) samples are acquired from fine siltstone and silty soil with homogeneous lithology, and paleo magnetism samples are taken in the interval of 0.5 - 1.0 m; sporopollen and microplaeontology samples are taken in the interval of 0.5 - 1.0 m and in the grey and dark-grey mucky soil horizon and those horizons containing fossil debris such samples are taken in smaller intervals.	Conduct 3 drawdown steady flow pumping tests with the steady durations being 24, 16 and 8 hours respectively.	During drilling, flush fluid within the borehole is observed from time to time, mud loss and the position where the wall collapses are recorded.	The whole borehole is cored; for clayey soil, the core recovery is more than 70 % and at least 60 % for a single layer; for sandy soil, the mean core recovery is more than 40 % and at least 30 % for a single layer.	Borehole diameter is 500 mm at Quaternary.	The 110 mm PDC bit is used to core the Quaternary.	For coring the Quaternary, the drilling pressure is 800 - 1000 kg and water flow is 100 - 150 l/s. Use a 108 mm core barrel to core the whole borehole.	Mud specific gravity is 1.2 - 1.3 and mud viscosity is 20 - 25.	The combined roller cone bit is used to ream the Quaternary borehole.	The pressure for reaming the Quaternary borehole is 1200 - 1500 and the water flow is the rated pump flow.	Mud specific gravity is 1.2 - 1.3 and mud viscosity is 20 - 25.	The casing pipe and the strainer pipe (both of which are 273 mm-diameter steel pipe) shall be placed down for the whole borehole.	The piston water pump is used to clean the borehole until water is clear without sand, meeting the requirement for pumping test.	1. The drilling site shall have water supply, access road and power supply. 2. The drill rig shall be installed securely and steadily, and the crown block, the vertical shaft and the borehole shall be in one single vertical line. 3. The drill tower shall be provided with the lightning arrestor and actions shall be taken to prevent thunder and electricity. 4. When operating in winter, the drill rig shall be installed with tower cover and actions shall be taken to prevent fire and freezing. 5. The mud ditch shall be long and have multiple pits so that rock debris settles fully to ensure mud's purity. 6. The pipe will be lifted and then placed down to ensure the borehole pipe's verticality. 7. Water shut-off shall be operated strictly to ensure the borehole quality. 8. Sample taken shall be sealed strictly in accordance with requirements. 9. RTK is used to measure the wellhead elevation and the wellhead shall be installed with protections.
4.80	13.60	Mucky silt																
2.70	16.30	Clay																
4.40	20.70	Medium sand																
27.30	48.00	Silt																
3.60	51.60	Fine sand																
3.00	54.60	Silty clay																
23.30	77.90	Silty sand																
2.50	80.40	Silty clay																
10.30	90.70	Fine siltstone																
2.00	92.70	Silt																
21.50	114.20	Fine sand																
5.70	119.90	Silty clay																
7.60	127.50	fine silty sand																
10.90	138.40	Silty clay																
2.70	141.10	Silt																
8.60	149.70	Silt																
4.50	154.20	Silty sand																
2.30	156.50	Silt																
8.30	164.80	Fine sand																
3.30	168.10	Silt																
5.30	173.40	Fine medium sand																
10.00	183.40	Silty clay																
11.40	194.80	Medium fine sand																
4.00	198.80	Medium fine sand																

Fig. 2 Typical geological drilling borehole protocol

Note: The typical geological drilling borehole protocol is used to predetermine any geological problems that may be encountered during operation, prior to actual operation commencing.

For geological recording purposes, cores are divided into layers by their acquisition sequence from new to old and then recorded and described, with a description of the core's lithology, mineral ingredients, structural components, biological fossils, sedimentary structures, occurrence, porosity and fissures, various secondary changes, etc.

Borehole logging includes three methods: natural gamma-ray logging, spontaneous potential logging and ultrasonic imaging logging. For each log, the diameter throughout the borehole must first be measured to understand the borehole diameter changes, and in what condition the casing is; when there is casing inside the borehole, the difference between the measured value of the casing diameter and the known borehole diameter shall be within ± 2 mm. The change in the borehole diameter curve represents the change in lithological hardness in the strata; the spontaneous potential curve can show the position of the permeable formation; the natural gamma-ray curve enables calculation of the content of argillaceous matter in the strata; images from supersonic imaging may also allow identification of how the stratum fissures develop and the determination of dip of the fissures.

2.4 Pumping Test

The pumping test is intended to obtain hydrogeological parameters regarding the aquifer

and aeration zone in order to provide basic data for the evaluation of groundwater resources. On the basis of analyzing data from existing hydrogeological boreholes and pumping tests in existing pumping (domestic) wells, subject to the spatial distribution features of parameters, the pumping test was conducted at localities where there were insufficient parameters. For the pumping test, the single well steady flow method was used to pump water in the reverse direction for three drawdowns for which the steady duration was 24 h, 16 h and 8 h. When water flow was very small or the water drop was insignificant, one drawdown could be made, but its steady duration was at least 24 h. When the water level in the pumping borehole could not be stabilized, a non-steady flow test with the largest drawdown was conducted. The pumping duration was dependent on the curve s-lg$t$, but was generally at least 24 h. During steady duration of the steady-flow pumping test, the water yield was reached and the water level was either steady or fluctuating within a certain range, but not depicting a rising or dropping trend. The error in water level fluctuation typically did not exceed 1% of the mean drawdown, and the fluctuation of the water yield was at least 3% of the mean flow rate.

2.5 Hydrogeological Survey in the Field

The main purpose of the hydrogeological survey in the field is to survey human activities related to water resources, groundwater, pollution and collect water samples. By observing, visiting and describing various phenomena relating to the geology, landform, groundwater points and others associated with groundwater for comprehensive study, it is intended to find their inherent relationships and identify groundwater depth and distribution. The main goals of a hydrogeological survey are:

(1) To investigate subsurface hydrogeological conditions and identify subsurface groundwater recharge, runoff and discharge conditions and its dynamic regularities;

(2) To investigate the current status, means of recovery, recovery volume and water supply objectives of groundwater;

(3) To investigate groundwater spatial distribution at cities and towns, industrial and mining enterprises and agricultural fields in concentrated areas;

(4) To investigate pollution sources, pollution paths, the extent to which surface water and groundwater is polluted.

During investigation, the emphasis is on investigating strata boundaries, fault lines, topographic border lines, places where natural geological phenomena are developed, wells, springs, boreholes, surface water bodies and important hydraulic projects using digital photography, camera recording, sketching, etc. to record phenomena such as geological landforms and hydrogeology and testing samples collected in the field with respect to indexes such as color, odor, scent, temperature, pH value, conductivity, oxidation/reduction potential and dissolved oxygen. Finally, the data are noted in the field investigation logbook and sheets, and then all data are entered into the investigation system database.

3 Description of Data Samples

The “Dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian

Lake Basin, Xiongan New Area", has 8 types of data, including "Properties of data from basic survey for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", "Properties of data from combined geological field survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", "Properties of data from stratum lithological boundary survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", "Properties of data from hydrogeological survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", "Properties of data from environmental geological survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", "Properties of data on basic information of drill boreholes for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", "Properties of data from comprehensive results of pumping tests for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" and "Properties of data from field pictures for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", adding up to 3,844 data in total.

"Properties of data from basic survey for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Field No., Longitude and latitude (°), Planar coordinates (*X, Y*), Surface elevation, Geographical location, Map No., Type of survey point, etc. as shown in Table 3.

Table 3 Properties of data from basic survey for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area

No.	Field name	Dimension	Data category	Real example
1	Unified No.	−	Character type	1150306273857170000
2	Field No.	−	Character type	XXDC6-005
3	Longitude and latitude	°	Floating-point type	Longitude: 115030627; Latitude: 38571700
4	Planar coordinates	−	Floating-point type	X: 315290.79823685; Y: 20331115.148791
5	Surface elevation	m	Floating-point type	6.0
6	Geographical location	−	Character type	The north side of the north levee of Guzhuangtou Village, Xiongzhou Town, Xiong City (County), Hebei
7	Map No.	−	Character type	Xiong County Map J50E007009
8	Type of survey point	−	Character type	Combined geological survey point

"Properties of data from combined geological field survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Landform and geological feature, Hydrogeological feature, Environmental geological feature, Visit and en-route feature, Feature of relations between measurement points, Artificial geological profile sketch (image), Survey point plan (image), Picture No., Investigation entity, Investigator, date of investigation (month/day/year), Recorder, Approver, etc. as shown in Table 4.

Table 4 Properties of data from combined geological field survey points for dataset of 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area

No.	Field name	Dimension	Data category	Real example
1	Unified No.	−	Character type	1154745903851164401
2	Landform and geological feature	−	Character type	The survey point standing in an alluvial-proluvial plain is on an artificial levee which is 3 m wide at the top, 5 m wide at the bottom and about 3 m in height, its east is a channel in which water is 3 m wide and about 0.5 deep and east of the channel belongs to the lake area; the levee top is an earth road and the west side of the levee has about 0.2 m high earth fill which becomes an earth road due to the fact that people often walk over it, with a house located to the northwest of the survey point; to the west of the earth road, there is about a 0.2 m high grove to the west with agricultural fields where corn grows; to the west of the agricultural fields there is about a 4 m wide and 2 m deep canal where water is 1 m deep; to the west of it there are agricultural fields. At the survey point, there is Quaternary Holocene alluvial-proluvium; the lithology outcropping at the east of the channel is, from top to bottom: 0~0.5 m silty clay, brownish yellow; 0.5~1.5 m, silty clay, brownish yellow. The lithology outcropping at the west of the channel is 0~1 m silty clay, brownish yellow, from top to bottom.
3	Hydrogeological feature	−	Character type	Aquifer in the aeration zone is the main one for use.
4	Environmental geological feature	−	Character type	Land is mainly used for crops and vegetation.
5	Visit and en-route features	−	Character type	From the measurement point AXDC 2-004 to the measurement point AXDC 2-005: the landform is flat, fluctuates slightly and is mostly farmland; there are deep excavated ditches en route for which the strike is north-west and its lower slope tilts towards the southeast.
6	Feature of relations between measurement points	−	Character type	From the last measurement point to this one, the landform is relatively flat and is mostly farmland and villages.
7	Artificial geological profile sketch (image)	−	Long binary data	(image)
8	Survey point plan(image)	−	Long binary data	(image)
9	Picture No.	−	Floating-point type	AXDC 01-069
10	Investigation entity	−	Character type	China Institute for Geo-environmental Monitoring
11	Investigator	−	Character type	ZHAO Kai, WANG Kailin
12	Date of investigation (month/day/year)	M.D.Y	Character type	Aug. 1, 2016
13	Recorder	−	Character type	WANG Kailin
14	Approver	−	Character type	ZHAO Kai

"Properties of data from stratum lithological boundary survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Field No., Route field No., Longitude (°), Latitude (°), Coordinates X and Y, Surface elevation, Geographical location, Map No., Landform type, Picture No., Features of two strata on borderline, Contact relationship, Surrounding environment, Relation between points, Profile sketch (image), Planar location sketch (image), Remark, project name, Investigation entity, Date of investigation (month/day/year), Investigator, Recorder, Approver, etc. as shown in Table 5.

Table 5 Properties of data from stratum lithological boundary survey points for dataset of 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area

No.	Field name	Dimension	Data category	Real example
1	Unified No.	–	Character type	1161219273859390000
2	Field No.	–	Floating-point type	XXDC7-001
3	Route field No.	–	Floating-point type	16
4	Longitude	–	Floating-point type	116121927
5	Latitude	–	Floating-point type	38593960
6	Coordinate X	–	Floating-point type	4318175.31
7	Coordinate Y	–	Floating-point type	20431156.61
8	Surface elevation	–	Floating-point type	7
9	Geographical location	–	Character type	500 m to the south of Nanzhuangzi Village, Zhanggang Town, Xiong County, Hebei
10	Map No.	–	Character type	Xiong County Map J50E007009
11	Landform type	–	Character type	Alluvial plain sub-region of accumulation plain
12	Picture No.	–	Floating-point type	P19# 520-2176-2178
13	Feature of two strata on borderline	–	Character type	The survey point is a lithological boundary point where the north is silty clay (Q_{4al+pl}), brownish yellow; its south is sandy silt (Q_{4al}), fawn. The lithology changes progressively from south to north and the sand content of the sandy silt gradually increases from the point southward to the river center.
14	Contact relationship	–	Character type	Sedimentary contact
15	Surrounding environment	–	Character type	The survey point is located in an about 1,400 meter-wide watercourse (Holocene paleo-river channel), both sides of which are artificial levees and the inner side of the landform is flat but low lying near the levee (soil borrow), the landform type of survey point belongs to an alluvial plain sub-region of an accumulation plain.
16	Relation between measurement points	–	Character type	The land around the point has been dry for many years, and has become an artificially arable land. Corn is planted mostly to its north while sweet potatoes are planted mostly to its south.
17	Profile sketch (image)	–	Long binary data	(image)
18	Planar location sketch (image)	–	Long binary data	(image)

Continued table 5

No.	Field name	Dimension	Data category	Real example
19	Remark	−	Character type	The survey point is located in the paleo-river channel of South Juma River.
20	Project name	−	Character type	Hydrogeological Survey (1∶50 000) on Anxin County and Xiong County, Baiyangdian Lake Basin
21	Investigation entity	−	Character type	Hebei Hydrological Engineering Geological Exploration Institute
22	Date of investigation (month/day/year)	.M.D.Y	Character type	Sep. 20, 2016
23	Investigator	−	Character type	WANG Shixiong, GUO Kaihua
24	Recorder	−	Character type	WANG Shixiong

"Properties of data from hydrogeological survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Sampling, Landform and topographical feature, Groundwater type, Measurement point type, Well structure, Well depth (m), Water level depth (m), Water-taking section, Well usage, Groundwater characteristics (temperature, color, odor, scent, turbidity, salinity, Eh, EC, DO, pH, TDS), Picture No., Investigation entity, Investigator, Date of investigation (month/day/year), Recorder, Approver, etc. as shown in Table 6.

Table 6 Properties of data from hydrogeological survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area

No.	Field name		Dimension	Data category	Real example
1	Unified No.		−	Character type	1154527163850286901
2	Sampling		−	Character type	Water sample for total analysis
3	Landform and topographical feature		−	Character type	Plain
4	Groundwater type		−	Character type	Phreatic water
6	Measurement point type		−	Character type	Pumping well
7	Well structure		−	Character type	Cement pipe
8	Well depth		m	Floating-point type	340
9	Water level depth		m	Floating-point type	28.46
10	Water-taking section		m	Floating-point type	230-300
11	Well usage		−	Character type	Agriculture and animal husbandry
12	Groundwater characteristics	Temperature	℃	Floating-point type	14.8
		Color, odor, scent	−	Character type	Colorless and odorless
		Turbidity	−	Character type	transparent
		Salinity	mg/L	Floating-point type	112
		Eh	mV	Floating-point type	74.7
		EC	mS/cm	Floating-point type	541
		DO	mg/L	Floating-point type	7.18
		pH	−	Floating-point type	8.23
		TDS	mg/L	Floating-point type	424.3

Continued table 6

No.	Field name	Dimension	Data category	Real example
13	Picture No.	–	Character type	AXDC 01-004
14	Investigation entity	–	Character type	China Institute for Geo-environmental Monitoring
15	Investigator	–	Character type	ZHAO Kai, WANG Kailin
16	Date of investigation (month/day/year)	M.D.Y	Character type	July 10, 2016
17	Recorder	–	Character type	WANG Kailin
18	Approver	–	Character type	ZHAO Kai

"Properties of data from environmental geological survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Field No., Map No., Longitude, Latitude, Geographical location, Surface elevation, Type of solid wastes, Land occupation type, Shape of accumulation body, Difficulty in restoration of occupied land, Description of stratum lithology, Landform, Topographical gradient, Surface lithology, Recharge type, Spring water discharge, Weather, Air temperature, Piling and burying methods, Banking-up state, Seepage proofing measures, Distance from residential area, Distance from the surface water, Distance from critical tourism destination facilities, Site stability, Distance from urban area, Plan sketch, Profile sketch, Remark, Project name, Investigation entity, Date of investigation, Investigator, Recorder, Approver, etc. as shown in Table 7.

Table 7 Properties of data from environmental geological survey points for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area

No.	Field name	Dimension	Data category	Real example
1	Unified No.	–	Floating-point type	1154710553851150000
2	Field No.	–	Floating-point type	AXDC01-070
3	Map No.	–	Character type	Anxin map J50E007008
4	Longitude	°	Floating-point type	115471055
5	Latitude	°	Floating-point type	38511590
6	Geographical location	–	Character type	Xinlizhuang Village, Anzhou Town, Anxin County, Baoding City, Hebei Province
7	Surface elevation	m	Floating-point type	7
8	Type of solid wastes	–	Character type	Domestic and industrial
9	Type of land occupation	–	Character type	Abandoned pit
10	Shape of accumulation body	–	Character type	Irregular
11	Difficulty in restoration of occupied land	–	Character type	Easy
12	Description of stratum lithology	–	Character type	Quaternary clay
13	Landform	–	Character type	Plain
14	Topographical gradient	°	Floating-point type	<8

Continued table 7

No.	Field name	Dimension	Data category	Real example
16	Recharge type	–	Character type	Rainfall, surface water
17	Spring water discharge	–	Character type	None
18	Weather	–	Character type	Overcast
19	Air temperature	℃	Floating-point type	28
20	Piling and burying methods	–	Character type	Simple landfill
21	Banking-up state	–	Character type	Ongoing
22	Seepage proofing measures	–	Character type	None
23	Distance from residential area	m	Floating-point type	<500
24	Distance from surface water	m	Floating-point type	<800
25	Distance from critical tourism destination facilities	km	Floating-point type	>10
26	Site stability	–	Character type	Stable
27	Distance from urban area	km	Floating-point type	>15
28	Plan sketch	–	Long binary data	(image)
29	Profile sketch	–	Long binary data	(image)
30	Remark	–	Character type	These points belong to Gangan Renewable Resources Co., Ltd., or Shangshangfang Renewable Resources Trade Co., Ltd., which mainly purchase and process used cables sent from Anzhou Town and surrounding places, and around the factory there are ditches to supply water from Baiyangdian Lake.
31	Project name	–	Character type	1∶50 000 hydrogeological survey at Anxin and Xiong County Map-sheet, Baiyangdian Lake
32	Investigation entity	–	Character type	China Institute for Geo-environmental Monitoring
33	Date of investigation	M.D.Y	Character type	Aug. 7, 2016
34	Investigator	–	Character type	ZHAO Kai, WANG Kailin, Gao Yu
35	Recorder	–	Character type	WANG Kailin
36	Approver	–	Character type	ZHAO Kai

"Properties of data from basic information of drill boreholes for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Geographical location, Map No., Borehole head elevation (m), Surface elevation, Drill rig type, Borehole type, Drilling start date, Drilling end date, Borehole deviation (°), Borehole start diameter (m), Borehole end diameter (m), Final borehole depth (m), Initial water level of aquifer (m), Static water level (m), Sampling, Drilling crew head, Geological recorder, date of investigation (month/day/year) and Approver, etc., as shown in Table 8.

Table 8 Properties of data from basic information of drill boreholes for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of Baiyangdian Lake Basin, Xiongan New Area

No.	Field name	Dimension	Data category	Real example
1	Unified No.	–	Character type	1160130313834283801
2	Geographical location	–	Character type	Water Park of Mingchuan Spa, Xiongzhou Town
3	Map No.	–	Character type	J50E007009
4	Borehole head elevation	m	Floating-point type	8.55
5	Surface elevation	m	Floating-point type	8.05
6	Drill rig type	–	Character type	GY-150
7	Borehole type	–	Character type	Quaternary loose borehole
8	Drilling start date	–	Character type	Nov. 12, 2016
9	Drilling end date	–	Character type	Nov. 19, 2016
10	Borehole deviation	°	Floating-point type	0.35
11	Borehole start diameter	cm	Floating-point type	110
12	Borehole end diameter	cm	Floating-point type	550
13	Borehole final depth	m	Floating-point type	151.65
14	Initial water level of aquifer	m	Floating-point type	15
15	Static water level	m	Floating-point type	13
16	Sampling	–	Character type	Water sample for total analysis
17	Drilling crew head	–	Character type	ZHANG Zhengtao
18	Geological recorder	–	Character type	LIU Ji
19	Date of investigation	M.D.Y	Character type	Sep. 10, 2016
20	Approver	–	Character type	GUO Xiao

"Properties of data from comprehensive results of pumping tests for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Pumping test No., Pumping test type, Equipment for pumping test, Start date, Duration/Steady duration/Water level rise and drop (m)/Water yield (m^3) for drawdown #1, Duration for water level restoration, Static water level (m) before and after pumping, Total duration of the test (h), Max. water yield per unit (m^3), Investigation entity, Investigator, Date of investigation (month/day/year), Recorder, Approver, etc. as shown in Table 9.

Table 9 Properties of data from comprehensive results of pumping tests for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of Baiyangdian Lake Basin, Xiongan New Area

No.	Field name	Dimension	Data category	Real example
1	Unified No.	–	Character type	1155550673856595201
2	Pumping test No.	–	Floating-point type	AXDC 1-056
3	Pumping test type	–	Character type	Single borehole pumping test
4	Equipment for pumping test	–	Character type	Three-inch submerged pump
5	Start date	–	Character type	Oct. 10, 2016

Continued table 9

No.	Field name	Dimension	Data category	Real example
6	Duration of drawdown #1	′	Floating-point type	720
7	Steady duration of drawdown #1	′	Floating-point type	300
8	Water level rise and drop of drawdown #1	m	Floating-point type	9.5
9	Water yield of drawdown #1	m^3	Floating-point type	7.65
10	Duration for water level restoration	−	Floating-point type	390
11	Static water level before pumping	m	Floating-point type	29.9
12	Static water level after pumping	m	Floating-point type	29.9
13	Total duration of the test	h	Character type	Water sample for total analysis
14	Max. water yield per unit	m^3	Character type	P16-108-1502-1504
15	Investigation entity	−	Character type	China Institute for Geo-environmental Monitoring
16	Investigator	−	Character type	WANG Guangpu, GUO Kaihua
17	Date of investigation (/month/day year)	M.D.Y	Character type	May10, 2016
18	Recorder	−	Character type	GUO Kaihua
19	Approver	−	Character type	WANG Shixiong

"Properties of data from field pictures for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" includes: Unified No., Date of photography, Picture type, Pictures, etc. as shown in Table 10.

Table 10 Properties of data from field pictures for the dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area

No.	Field name	Dimension	Data category	Real example
1	Unified No.	−	Floating-point type	1160656810852160000
2	Date of photography/time	Hh:mm:ss: ss D.M.Y	Character type	13:48:24, 24 Sep. 2016
3	Picture type	−	Character type	Stratum lithological border line survey point logbook
4	Picture	−	Long binary data	(image)

4 Data Quality Control

All work within the study area was done in accordance with the national specification *Specification for Hydrogeological Survey (1∶50 000)*, and all datasheets were generated as per its attached Sheet, the degree of achieved precision meeting its requirements.

All survey datasheets for the working area were 100% self-checked and mutually-checked, 15% of all collated datasheets were randomly inspected and the results from such random inspections demonstrated that the quality met the credibility requirement for hydrogeological survey in the specification.

5 Conclusions

In the project of the "Hydrogeological Survey (1∶50 000) on the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area", the hydrogeological survey of Anxin and Xiong Counties was performed in accordance with DZ/T0282-2015 *Specification for Hydrogeological Survey* (1∶50 000) and integrated research was undertaken, building on the survey result, and finally resulting in the creation of the "Dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area". This dataset has 8 types of data, including 895 basic survey data, 22 data from combined geological field survey points, 82 data from stratum lithological boundary survey points, 540 data from hydrogeological survey points, 22 data from environmental geological survey points, 12 data on basic information from drilled boreholes, 71 data from comprehensive results of pumping tests and 2 200 data from field pictures, constituting 3,844 data in total (format: *.accdb).

Creation of the "Dataset of the 1∶50 000 hydrogeological map of the Plain Area of the Baiyangdian Lake Basin, Xiongan New Area" not only provides detailed scientific data to support understanding of the hydrogeological conditions for the purposes of planning and building Xiong'an New Area in the future, but also has cumulative and important implications as a reference work, for more accurately understanding the structure of the groundwater system, groundwater recharge, runoff and discharge conditions and features of groundwater dynamic change in the Baiyangdian Lake Basin in the future. The creation of the dataset complements the national basic scale hydrogeological database system, provides a fundamental data resource to fully demonstrate the recent level of hydrogeological survey in China and generates conditions for satisfying the need for other researchers to query hydrogeological data and information about the region to the maximum extent, sharing information resources. Additionally, it provides a foundation for the social sharing of results from the fundamental and public benefit of geological survey (Pang JF, 2017).

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