



Application of Beidou in Natural Disaster Emergency Management in China

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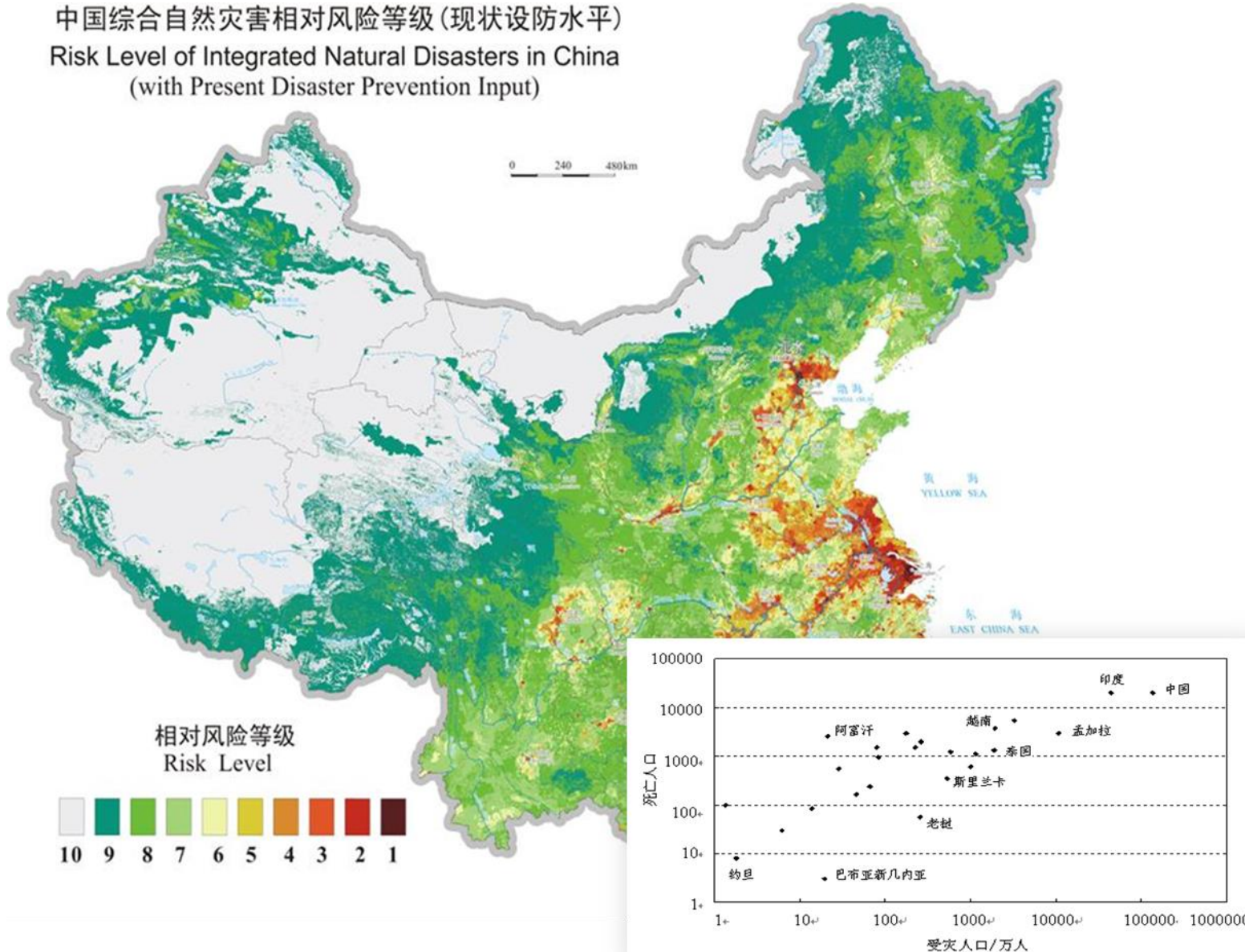
P. R. China



1. Natural Disasters and the Situation of Disaster Prevention, Mitigation and Relief in China

China is seriously affected by natural disasters

中国综合自然灾害相对风险等级 (现状设防水平)
Risk Level of Integrated Natural Disasters in China
(with Present Disaster Prevention Input)

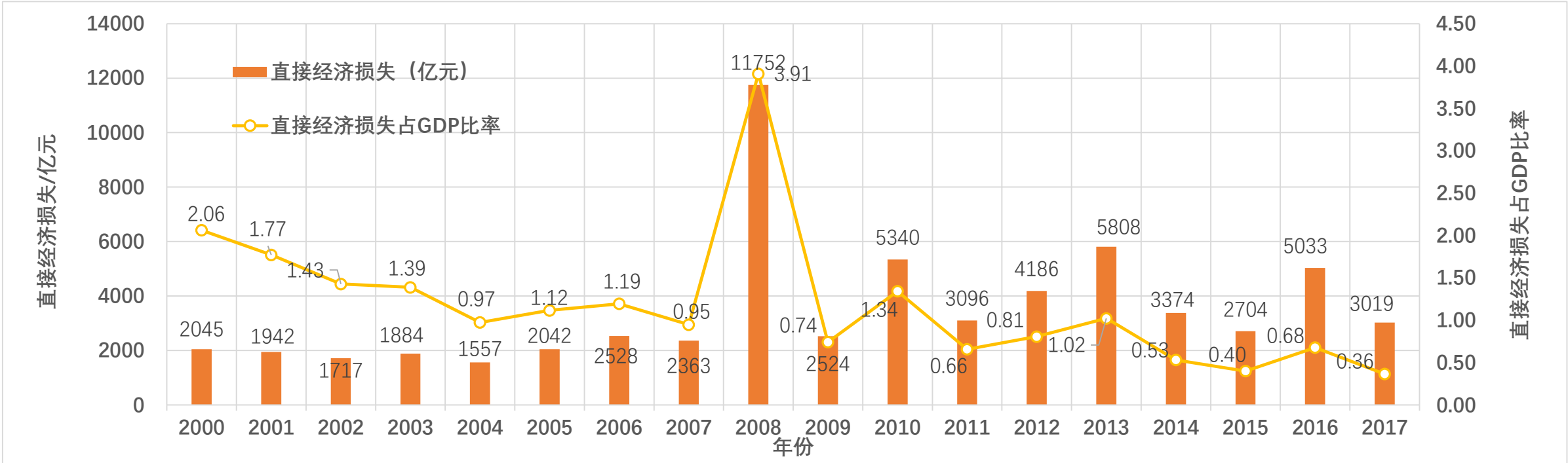
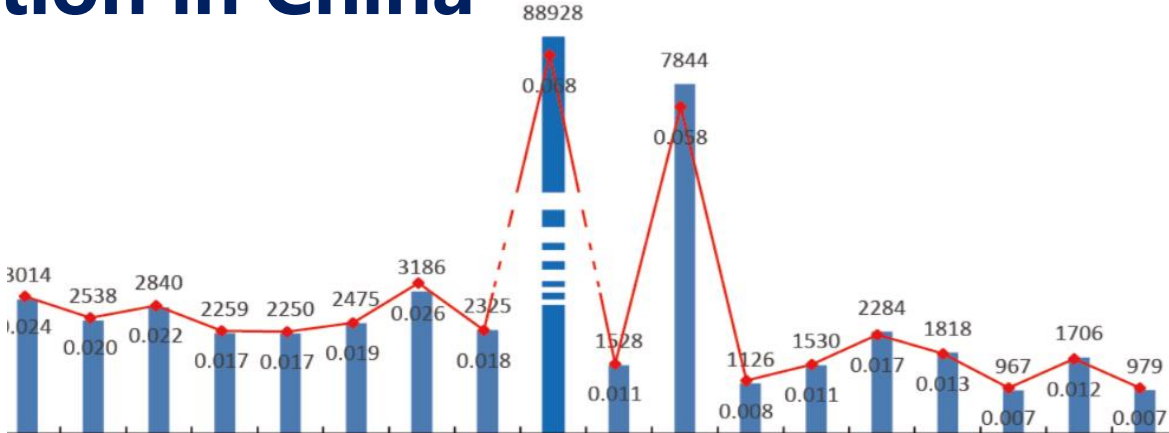


- Diverse disasters are widely frequently distributed in China, resulting to many casualties and huge economic losses.
- More than 70% of cities, more than 50% of the population, and more than 75% of industrial and agricultural economic value is under disaster risk.
- Much effort should made for disaster mitigation management.

Trends of natural disasters situation in China

Since 2000,

- ◆ The direct economic losses have been increasing year by year, while the proportion of direct economic losses in GDP has been decreasing.
- ◆ Disaster-related deaths and missing persons show a steady downward trend throughout the country.



Severe natural disaster occurs from time to time

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- ❑ Low Temperature, Rain and Snow Freeze in South China in 2008
- ❑ Wenchuan Earthquake in 2008
- ❑ Qinghai-Yushu Earthquake in 2010
- ❑ Gansu -Zhouqu Debris Flow Disaster in 2010
- ❑ Flood Disaster in Beijing, Tianjin and Hebei in 2012
- ❑ Sichuan-Lushan Ms. 7.0 Earthquake in 2013
- ❑ Typhoon Wilmson in 2014
- ❑ Yunnan-Ludian M6.5 Earthquake in 2014
- ❑ Landslide of Shenzhen Industrial Area in 2015
- ❑ Tornado and hail in Yancheng in 2016
- ❑ Sichuan-Maoxian in 2017
- ❑ Typhoon Winbia in 2018
- ❑ Jinsha River Dam Lake on Sichuan-Tibet Border in 2018

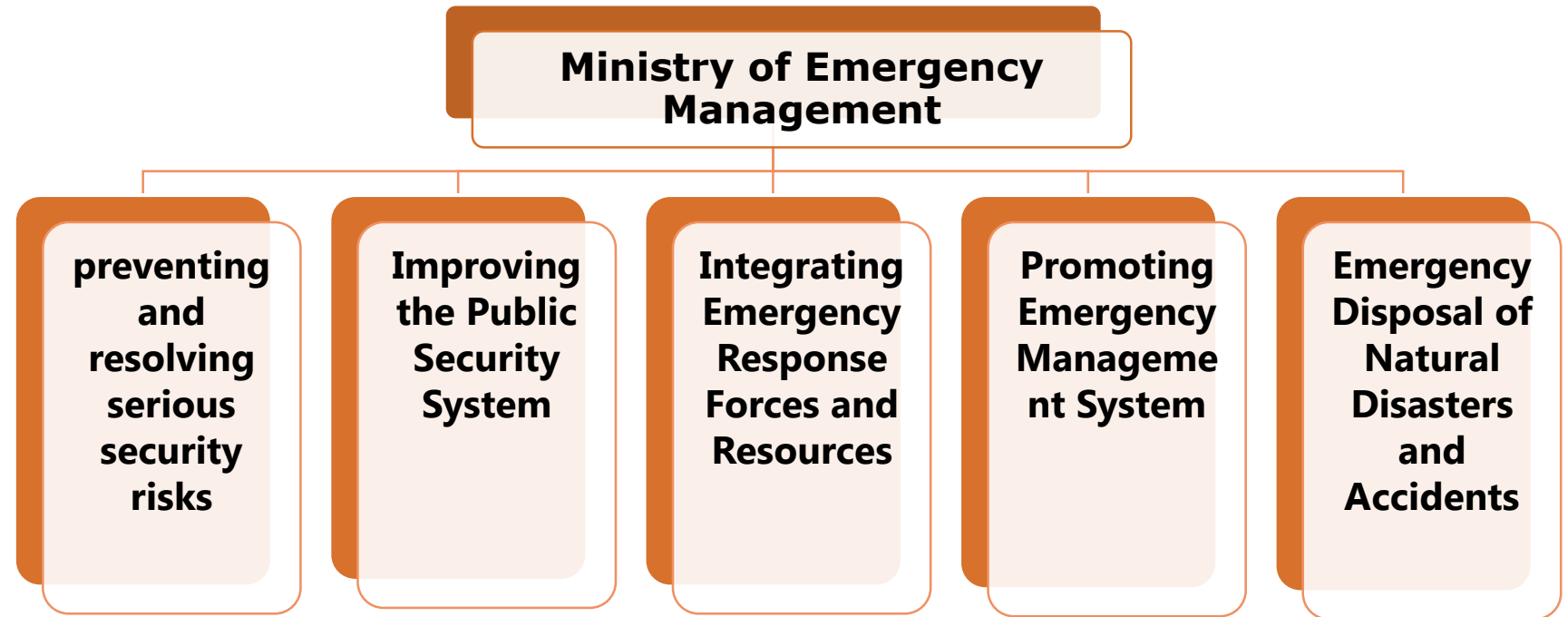
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With the development of urbanization, the continuous expansion of "high-risk cities" and the rapid accumulation of urban disaster risk put forward higher requirements for the operation and management of metropolitan areas in China.



System of Disaster Emergence Management in China

In April 2018, the central government of China integrated disaster management roles of 13 ministries or institutions to form Ministry of Emergency Management, which coordinates and manages the prevention and emergency rescue of natural disasters throughout the country.



Building the national comprehensive fire emergency rescue force

- As the main force and national team of emergency rescue, it undertakes the important responsibility of preventing and resolving major security risks and dealing with all kinds of disasters and accidents.



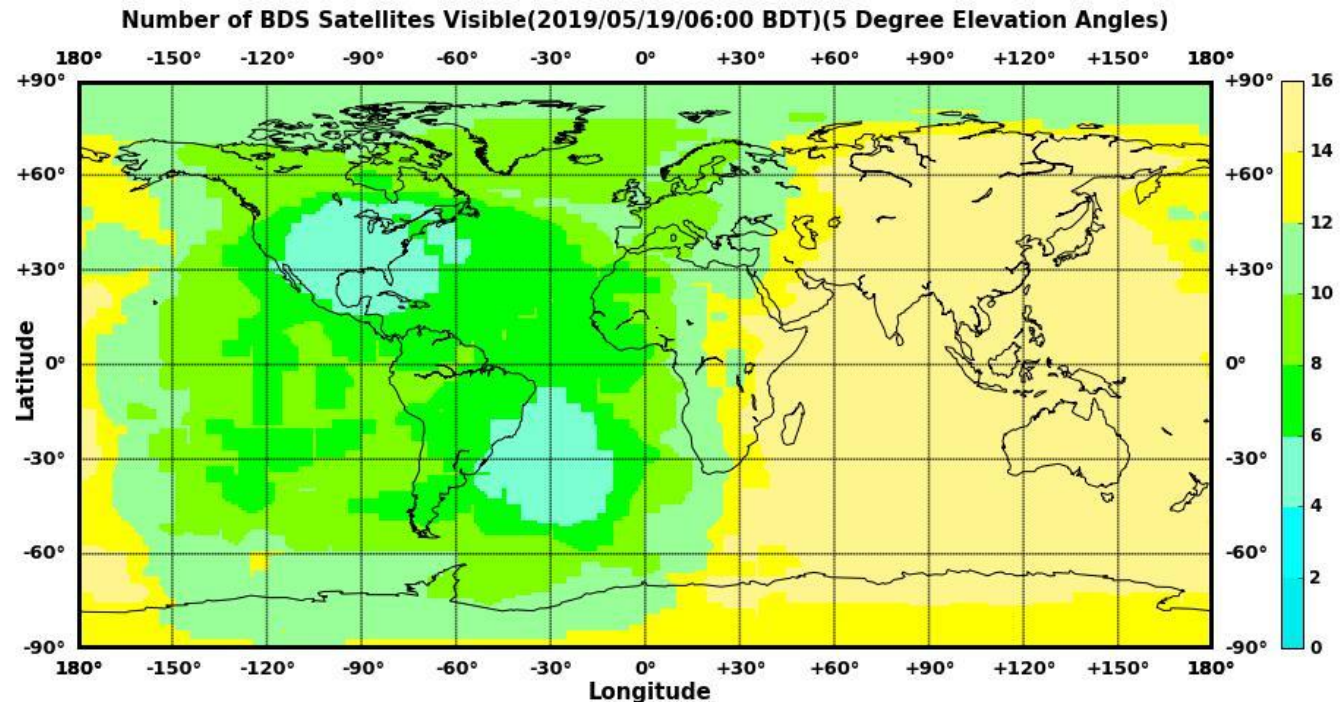
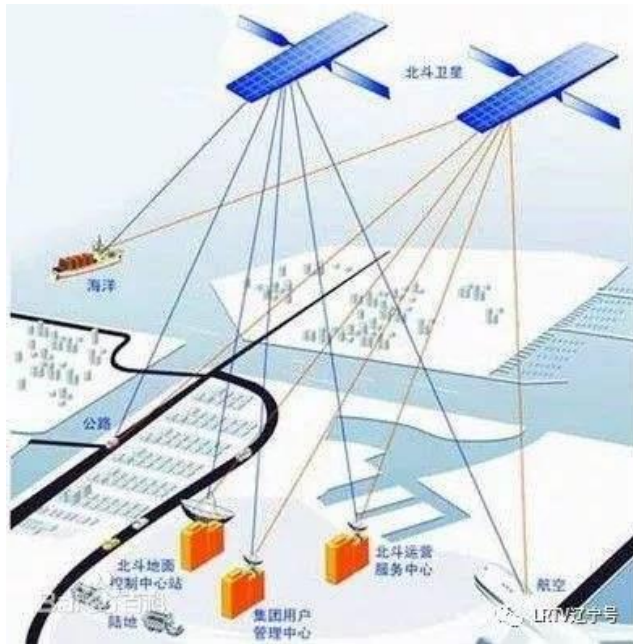
Operation of Disaster Management in China

- ❑ Construction and drills of emergency plan system.
- ❑ Management and releasing of disaster situation.
- ❑ Construction of disaster relief system. Management and dispatch of relief force and goods.
- ❑ Disaster emergency rescue of production safety and natural disasters.
- ❑ Disaster prevention and treatment。
- ❑ Supervision and management of production safety。
- ❑ Construction and management of national emergency relief force。
- ❑ Comprehensive coordination for disaster prevention, mitigation and relief。



Advantages of Beidou in disaster prevention, mitigation and relief

- Integration of positioning and communication, which can realize remote monitoring of relief materials and personnel on real time.
- No communication blind area, which can solve the problem of disaster information data transmission after Communication interruption due to disasters or in no communication coverage.



2.Current Application Progress of Beidou Disaster Reduction and Relief

Beidou's application has achieved remarkable results in recent years

□ Reporting disaster information quickly.



□ Monitoring disaster relief materials nationwide.



□ Support for disaster reporting in information network.



□ Assist for disaster loss investigation and assessment.



□ Emergency monitoring for human search and rescue.

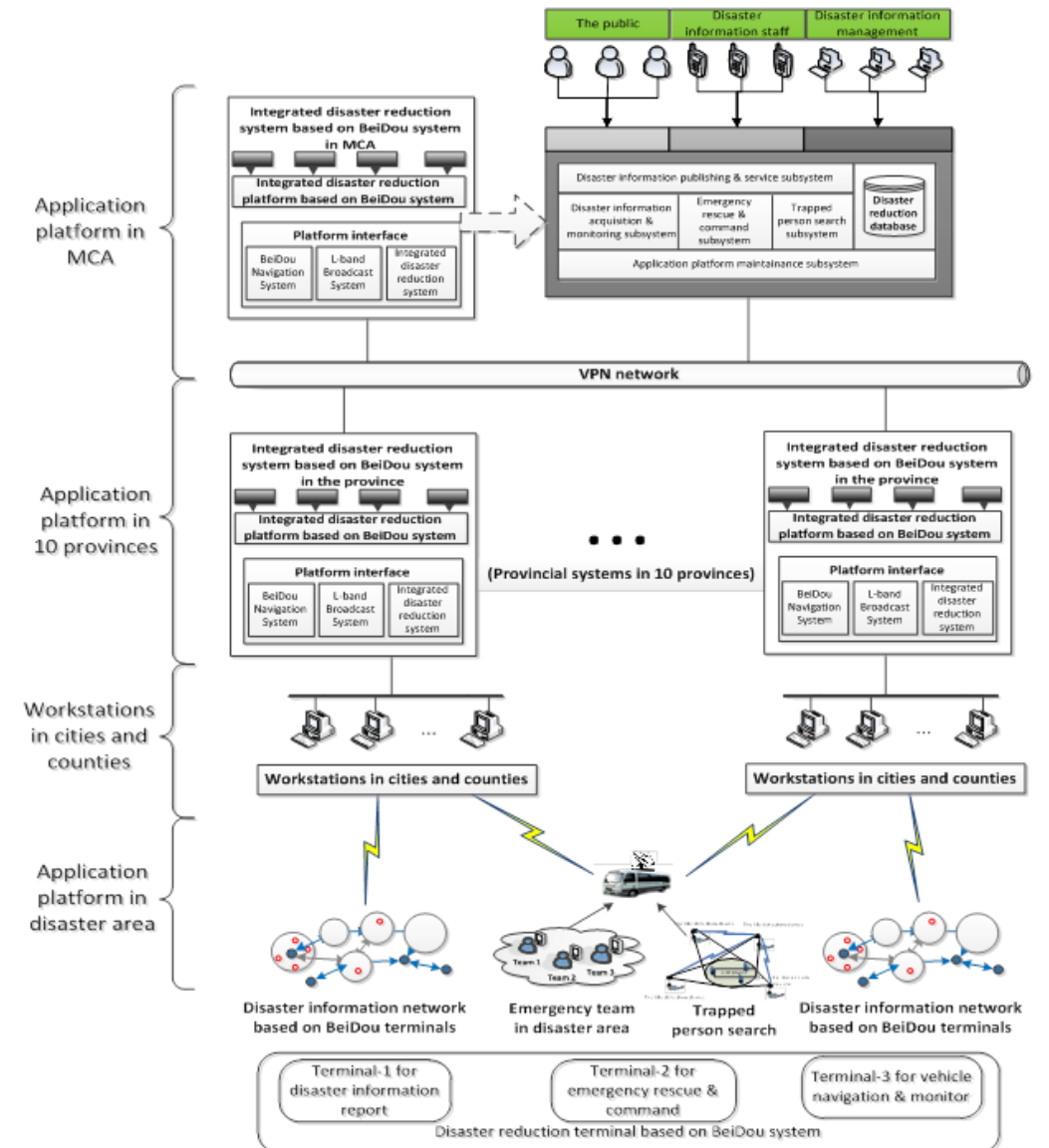


□ Location-based disaster information orient service



Build the Beidou Comprehensive Disaster Reduction Application System

Comprehensive Disaster Reduction Application System covering the national, provincial, municipal, county and community levels can strong support for the Disaster Emergency Management.



Development and distribution of exclusive-relief Beidou terminals

- Three types of Beidou terminals are developed for disaster informants, relief vehicles and emergency personnel.



Disaster Reporting

- BDS/GPS navigation;
- 4G transmission, voice calls;
- Community disaster reporter.



Vehicle Navigation and Monitoring

- BDS/GPS navigation;
- 4G transmission, Beidou short message;
- Disaster relief vehicles.



Emergency Rescue

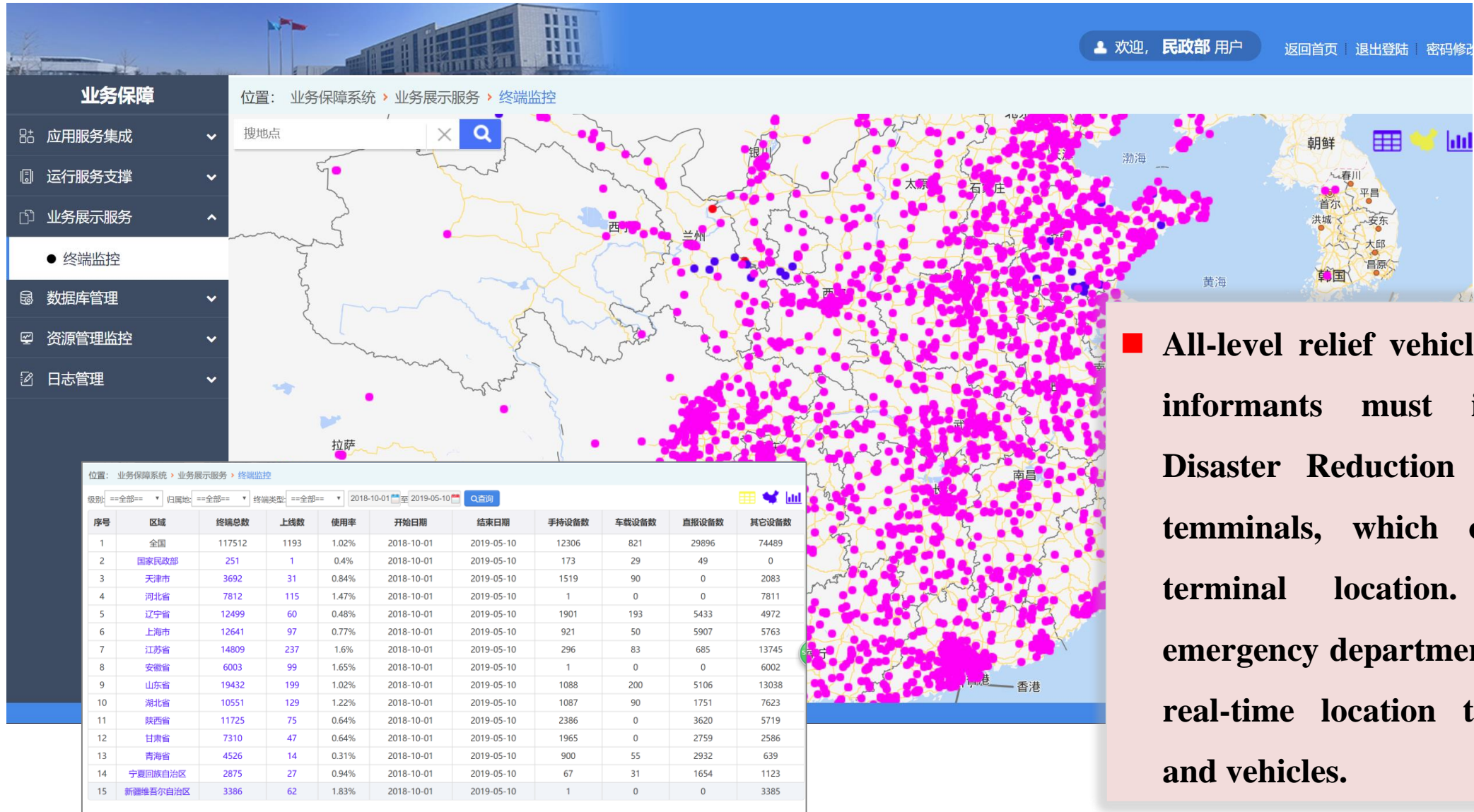
- BDS/GPS navigation;
- 4G transmission, voice calls, Beidou short message ;
- Disaster Relief Professionals.

Applications 1: Beidou message become an auxiliary emergency communication

The image displays the '北斗减灾运营中心服务系统' (Beidou Disaster Reduction Operation System) interface. The top header includes the system name and a user role dropdown set to '管理员' (Administrator). A left sidebar contains navigation options such as '管理列表' (Management List), '实时监控' (Real-time Monitoring), '节点管理' (Node Management), and '北斗短报文' (Beidou Short Messages). The main area features a map of China with a network of nodes and connections, labeled with various provinces like 新疆 (Xinjiang), 北京 (Beijing), and 上海 (Shanghai). Below the map, two mobile device screenshots are shown: one for WeChat messages and one for SMS messages. The WeChat screenshot shows a conversation with '北斗用户(319086)' and a message about sending a message from Beijing. The SMS screenshot shows a message from '13651148787' regarding a power outage and a request for support. A red caption 'Send WeChat message by Beidou' is placed over the WeChat screenshot, and another red caption 'Send SMS message by Beidou' is placed over the SMS screenshot. In the bottom right corner, there is a photograph of the physical control room, featuring several computer monitors on desks and a wall sign that reads '综合减灾平台运行管理中心' (Comprehensive Disaster Reduction Platform Operation Management Center) and '民政减灾北斗运营服务中心' (Ministry Disaster Reduction Beidou Operation Service Center).

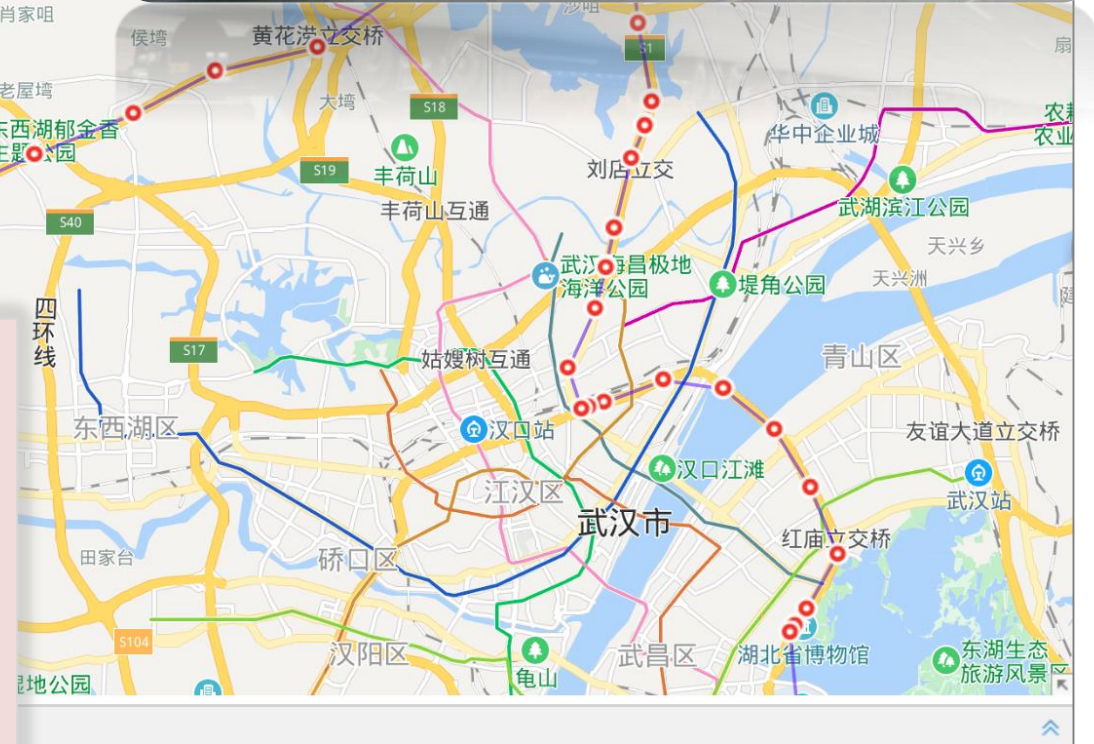
- The Beidou Disaster Reduction Operation System can broadcast short messages for all Beidou terminals, and send short message for a specific terminal.
- The system can help all terminals communicate each other by short message.
- System function of Beidou Chat can exchange between short messages and SMS or WeChat.

Applications 2: Monitoring relief personnel and vehicles all over country



■ All-level relief vehicles and disaster informants must install Beidou Disaster Reduction APP on their terminals, which obliges to get terminal location. So all-level emergency departments can monitor real-time location their personnel and vehicles.

Applications 2: Monitoring relief personnel and vehicles all over country



- After emergency response starts up, all level emergency departments can on-line remotely monitor the real-time location and path of relief personnel and vehicles in disaster-affected area, which solves the problem of emergency communication after communication interruption.

Applications 3: Collecting and reporting disaster information

NNDIMS 国家自然灾害灾情报送系统

返回 首页

选择灾种: 受灾区域:

发生时间: 不限 至 上报时间: 不限

死亡失踪人口: 人 紧急转移救助: 人 倒塌严重房屋: 间 直接经济损失:

刷新数据 全部灾害过程

序号	区域	灾种	发生时间	上报时间	报表类型
1	内蒙古自治区	风雹	2019-05-11	2019-05-13 20:56:06	续报
2	陕西省	低温冷冻	2019-05-13	2019-05-13 20:49:56	初报
3	陕西省	风雹	2019-05-10	2019-05-13 20:46:54	续报
4	河北省	风雹	2019-05-11	2019-05-13 19:51:21	续报
5	四川省	风雹	2019-05-10	2019-05-13 19:37:50	续报
6	甘肃省	风雹	2019-05-11	2019-05-13 19:15:54	续报
7	河南省	风雹	2019-05-13	2019-05-13 19:15:23	初报
8	甘肃省	滑坡	2019-05-10	2019-05-13 18:54:49	核报
9	湖南省	洪涝	2019-05-12	2019-05-13 18:46:58	续报

- Beidou plus Mobile Internet has realized level-by-level disaster collection and reporting from communities to towns, counties, cities, provinces and central authorities by mobile terminals.
- All disaster information is accompanied by location.
- The integration of Beidou short message and mobile communication can report disaster situation by mobile terminal after communication interruption in disaster-stricken area.

发生时间: 09月22日 星期二 14:43

选择灾种

干旱 洪涝 风雹 台风
地震 山体崩塌 滑坡 泥石流
低温冷冻 雪灾 风暴雨 海啸
森林草原火灾 生物灾害 其他

123 12 10
受灾人口(人) 因灾死亡人口(人) 因灾失踪人口(人)
人 人 万元
被困人口(人) 紧急转移安置人口(人) 直接经济损失(万元)
亩 亩 亩
农作物受灾面积(亩) 农作物成灾面积(亩) 农作物绝收面积(亩)
间 间 间
倒塌房屋间数(间) 严重损坏房屋间数(间) 一般损坏房屋间数(间)

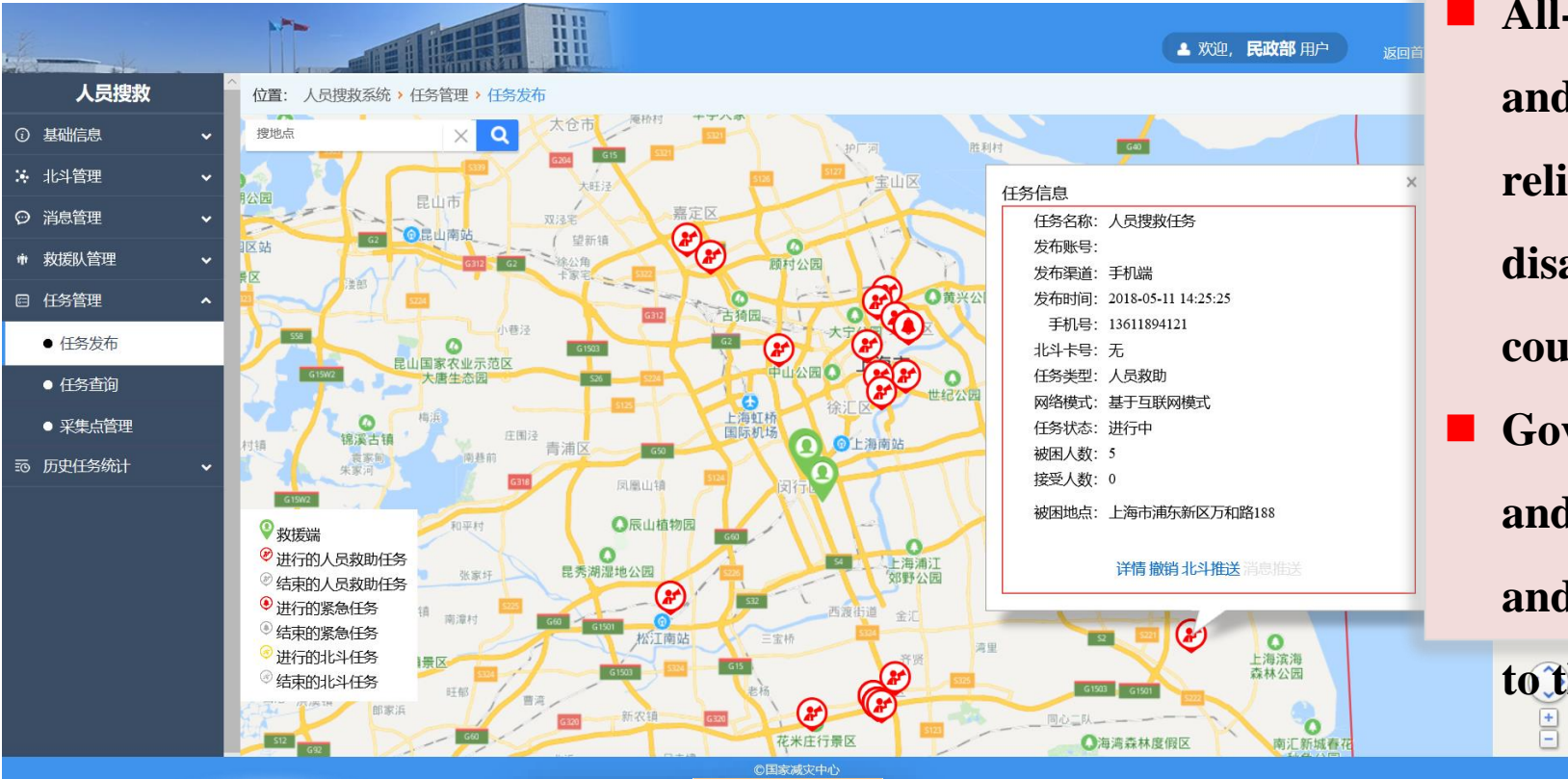
灾害场景 房屋倒塌 农作物受灾 道路损毁
人员伤亡 财产损失 受灾群众 受灾牲畜
临时安置点 领导慰问 灾后生活 消毒防疫
救援物资 医疗救助 救灾人员 救援现场
抢险救灾 其他

照片列表
灾害信息: 山体崩塌
发生时间: 2015-09-22 14:43:00
图片主题: 房屋倒塌

指标项数据
倒塌房屋户数: 12 间
严重损坏房屋户数: 10 间
一般损坏房屋户数: 5 间

照片备注
测试

Applications 4: Search and rescue of trapped persons



- All-level disaster informants can mark and release the number, location and relief demands of trapped people in disaster-stricken area on the whole-country map.
- Governmental relief forces, volunteers and social organizations would search and rescue the trapped people according to the released task.



Applications 5: On-line monitor relief material transportation

国家救灾应急物资储备管理系统

NDREM 入库管理 调令管理 借调管理 报废管理 统计查询

本级物资查询

储备库: 全部 物资类别: 全部

库类型: 自有 代储

储备库	炉子	场地照明设备	60m ² 单帐篷	12m ² 单帐篷	36m ² 棉帐篷	12m ² 棉帐篷	60m ² 单框架帐篷	36m ² 单帐篷	20m ² 棉帐篷	20m ² 单帐篷	12m ² 单折叠帐篷	睡袋	棉大衣	纯棉棉被	纯涤棉被	棉被	混合棉被	苫布
总计	13700	500	221	147209	11749	57846	1966	44852	7704	9969	591	87458	454035	170000	149780	399397	145000	1499
天津	6200	0	10	0	2000	5516	100	4750	0	0	0	18000	19998	10000	0	29999	0	0
哈尔滨	7500	100	20	1932	500	9952	0	5000	3302	0	0	0	26900	20000	22000	0	0	0
沈阳	0	200	10	13000	0	10500	0	4980	1802	0	0	2500	25000	20000	0	20000	0	2500
福州	0	50	10	15250	0	700	100	300	0	0	0	5500	50000	0	0	30998	0	0
武汉	0	40	20	16391	0	5875	278	300	0	970	546	11060	11900	0	10000	0	22000	0
南京	0	50	20	11794	0	0	100	100	0	0	0	23500	9999	0	10000	40500	0	0
兰州	0	10	10	5998	0	8000	100	1698	0	0	0	0	41000	22000	0	46000	0	2998
乌鲁木齐	0	50	10	3483	822	524	0	0	303	0	0	0	25250	330	0	0	0	0
北京	0	0	20	999	0	0	0	0	0	0	0	5500	50000	100	0	0	0	0
合肥	0	0	10	7750	0	700	199	3000	0	0	0	5500	32000	0	0	0	0	0
郑州	0	0	10	3998	1900	0	99	10480	0	0	0	4900	45000	330	0	0	0	0
长沙	0	0	10	3000	1000	2000	200	6085	0	2000	0	0	1990	0	0	0	0	0
成都	0	0	10	26773	463	100	200	3191	508	2999	0	0	34899	0	0	0	0	0
昆明	0	0	8	22960	0	2000	190	3169	0	0	0	10998	25000	0	0	0	0	0
拉萨	0	0	3	5000	0	3996	0	0	0	0	0	0	24999	0	0	0	0	0
渭南	0	0	10	3000	5064	2000	200	1799	0	4000	0	0	3200	0	0	0	0	0
西宁	0	0	0	3998	0	1498	200	0	1789	0	0	0	0	0	0	0	0	0
格尔木	0	0	20	1000	0	2500	0	0	0	0	45	0	15000	0	0	0	0	0
喀什	0	0	10	883	0	1985	0	0	0	0	0	0	11900	220	0	0	0	0

■ Relief material distribution vehicles are required to install Beidou terminals, so that all-level emergency departments can dynamically and remotely monitor the transportation route from material reserves to the disaster-stricken area.

国家救灾应急物资储备管理系统

NDREM 入库管理 调令管理 借调管理 报废管理 统计查询 地图统计 物资监控

调令号

- 民救办字【2017】83号
- 民救办字【2017】63号
- 民救办字【2017】56号
- 民救办字【2017】52号
- 民救办字【2017】51号
- 民救办字【2017】50号
- 民救办字【2017】49号



Applications 6: Location-based directional release of disaster information

The screenshot displays a web-based disaster information release system. The main interface features a map of China with red circular markers indicating disaster locations. A sidebar on the left lists disaster events, and a dropdown menu on the right shows disaster types. A secondary mobile app interface is shown on the right side of the main screenshot.

全国灾情		
全国灾害: 20例	发生日期: 2019-05-01-2019-05-31	
新疆维吾尔自治区	灾害1例	
风雹	2019-05-02	
宁夏回族自治区	灾害1例	
风雹	2019-05-09	
青海省	灾害3例	
滑坡	2019-05-07	
洪涝	2019-05-06	
风雹	2019-05-04	
甘肃省	灾害4例	
洪涝	2019-05-06	
滑坡	2019-05-10	
风雹	2019-05-09	
滑坡	2019-05-02	
云南省	灾害1例	

灾种

- 干旱 (0)省
- 洪涝 (5)省
- 风雹 (9)省
- 台风 (0)省
- 地震 (0)省
- 低温 (0)省
- 崩塌 (0)省

实时灾情

- 北京市古北口镇发生特大洪涝灾害 2015-08-29 22:08:00
- 四川省绵阳市发生7.1级地震 2015-08-13 15:23:56
- 福建省莆田市发生特大洪涝灾害 2015-08-11 10:24:26
- 四川都江堰市山区发生山体滑坡

灾情数量趋势变化

按月 按年

■ with Beidou terminal APP, all-level disaster managers, volunteers and the public can receive all kinds of local disaster-related information based on geographical location, such as the latest weather, earthquake, hydrology, typhoon, disaster situation and so on.

The operational and technical conditions for Beidou promotion have been established

- ❑ **Beidou Disaster Reduction Operational Service Center**
- ❑ **technical standards for Beidou terminal and Beidou platform construction**
- ❑ **Beidou Operational Service Software System**
- ❑ **Beidou Disaster Reduction Application Software System**
- ❑ **Training curriculum**

■ **According to incomplete statistics, 13 provinces in China are promoting the application of Beidou systematically. The application of Beidou is expanding steadily in emergency management system.**

3. New Trend of Application of Beidou in National Disaster emergency management in future

Emergency response mechanism for accidents and disasters in China



Earthquake



Coal Mine



Non-Coal Mine



**Dangerous
Chemical/Trade**



Fire



Traffic



Flood



Forest Fire



New demand of Beidou application to disaster emergency management

The Chinese government has vigorously promoted the nationwide emergency management informationization.

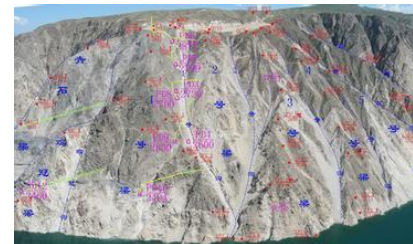
- Disaster perception network
- Emergency communication network
- Emergency command informatization
- Disaster monitoring and early warning
- Safety-Production monitoring and early warning
- Risk investigation and Hidden danger investigation



The unique characteristics of Beidou system, which integrates positioning, navigation, timing and short message, provide a broader development space for the application of Beidou disaster emergency management.

Technological problems to be solved urgently in the application of Beidou to disaster prevention, mitigation and relief

- Integration of Beidou and China's satellite communication system
- Geospatial scope and ability of Beidou short message service
- High-precision positioning capability of Beidou for disaster risk monitoring
- Integration of Beidou and indoor navigation
- Application of Beidou big-data fusion analysis
- New Beidou equipments for disaster prevention, mitigation and relief



Summary

- China is the country with the most serious natural disasters in the world. Beidou has played an important role in disaster emergency management in two aspects.
- Aspect 1 - *Beidou short message function*, which has solved problems of field communication and disaster information reporting after communication interruption.
- Aspect 2 – *Beidou navigation and positioning function*, which have been used to disaster information collection, personnel and material monitoring, emergency rescue, and directional information release.
- In future, the main direction of Beidou application in China will focus on *disaster risk monitoring, early warning and fire rescue*. **Beidou high-precision positioning and Beidou integration with indoor navigation are two key fields.**

Thank you for attention

