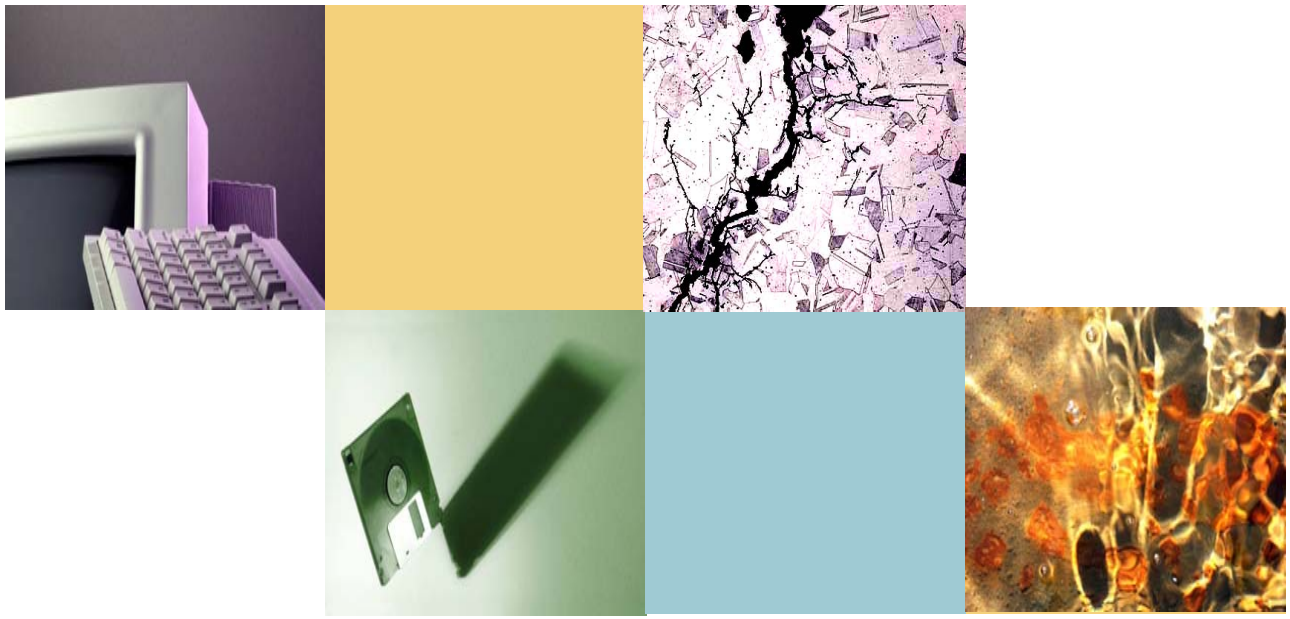
Construction and Application of China Environmental Corrosion Data-Sharing Network

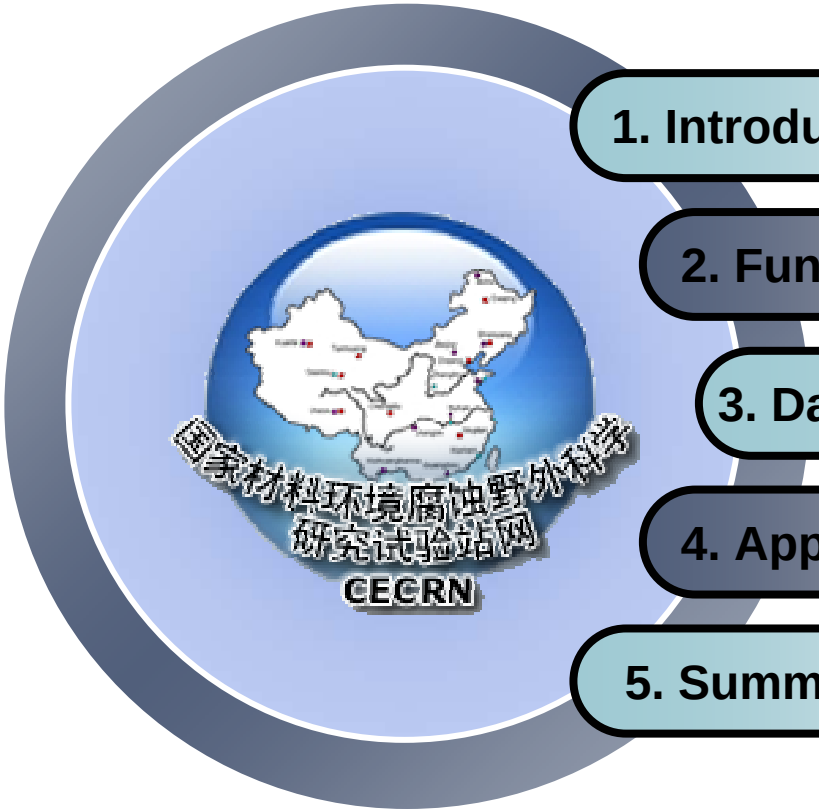


Xiaogang LI, Lin LU

Corrosion & Protection Center

University of Science & Technology Beijing

Outline

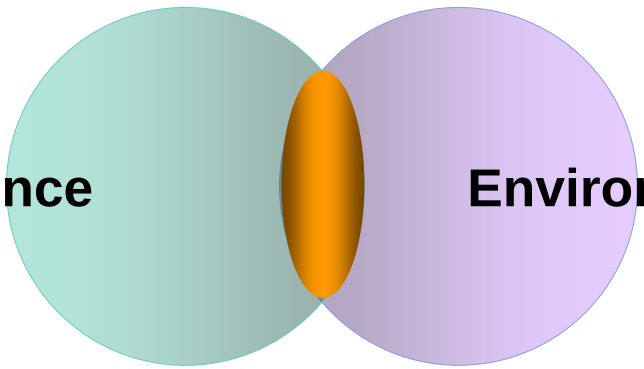


1. Introduction
2. Fundamental Conditions
3. Data-sharing Network Construction
4. Application Cases
5. Summary & Prospect

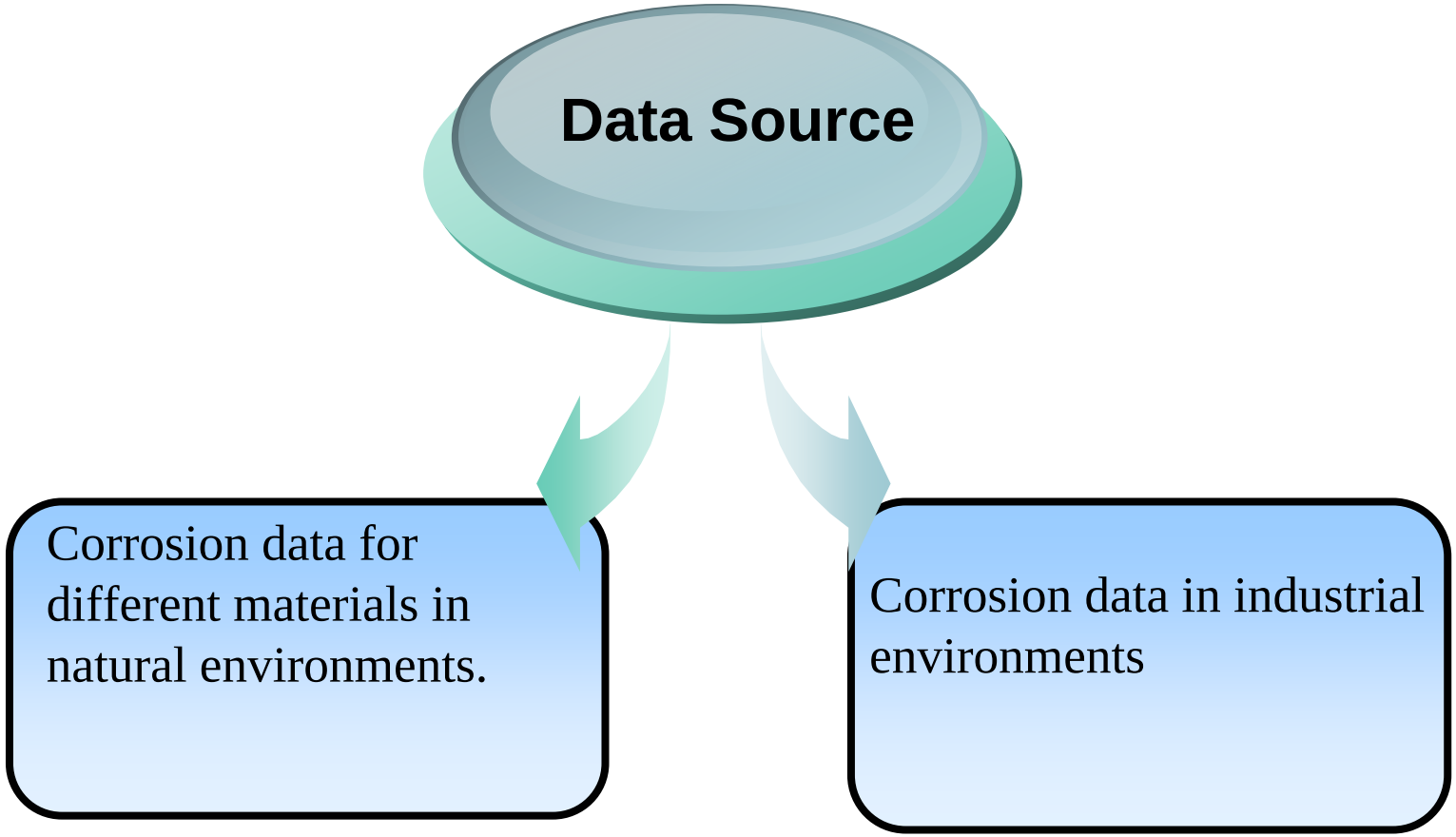
Introduction

What is corrosion?

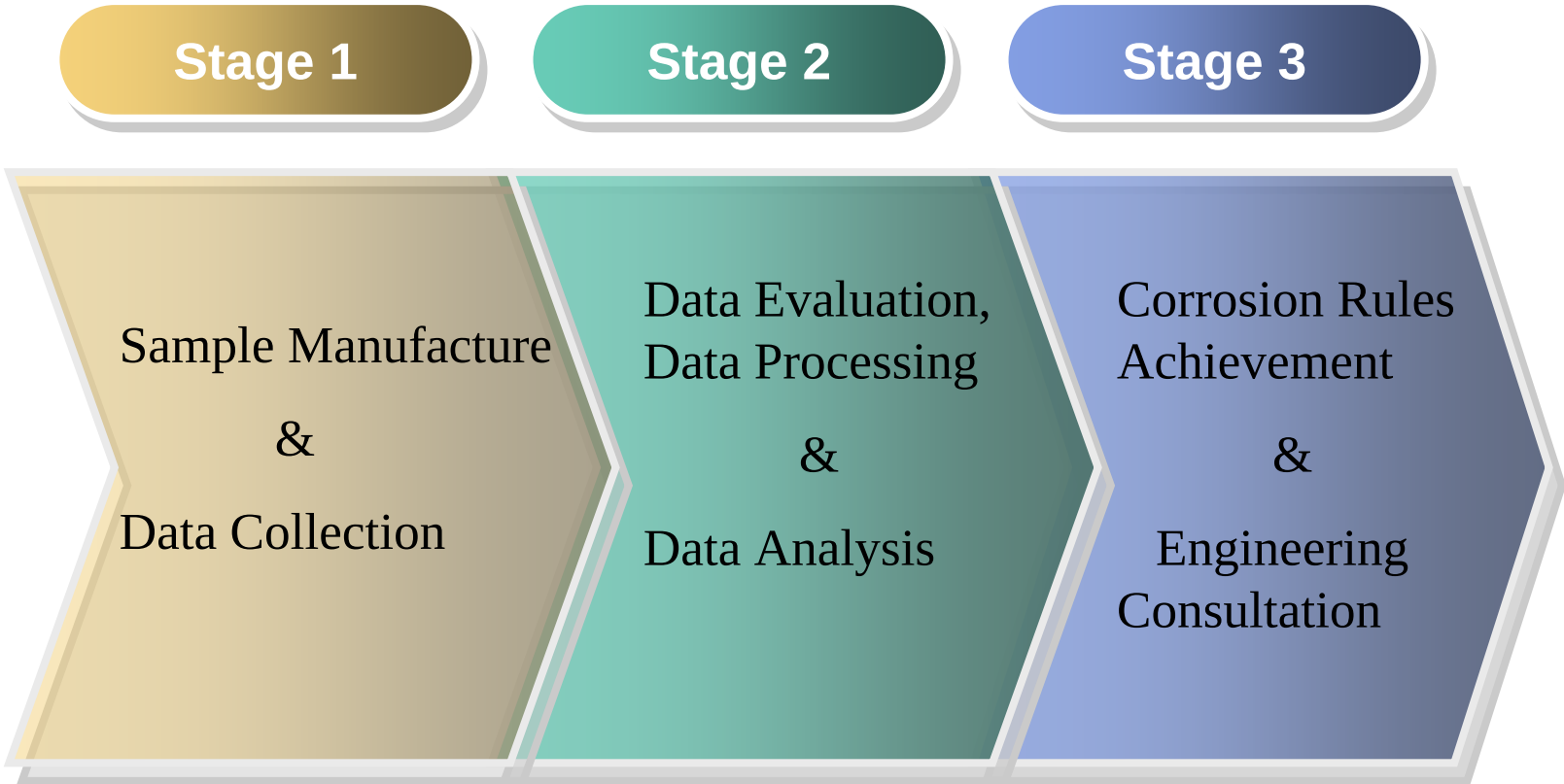
What is environmental corrosion?



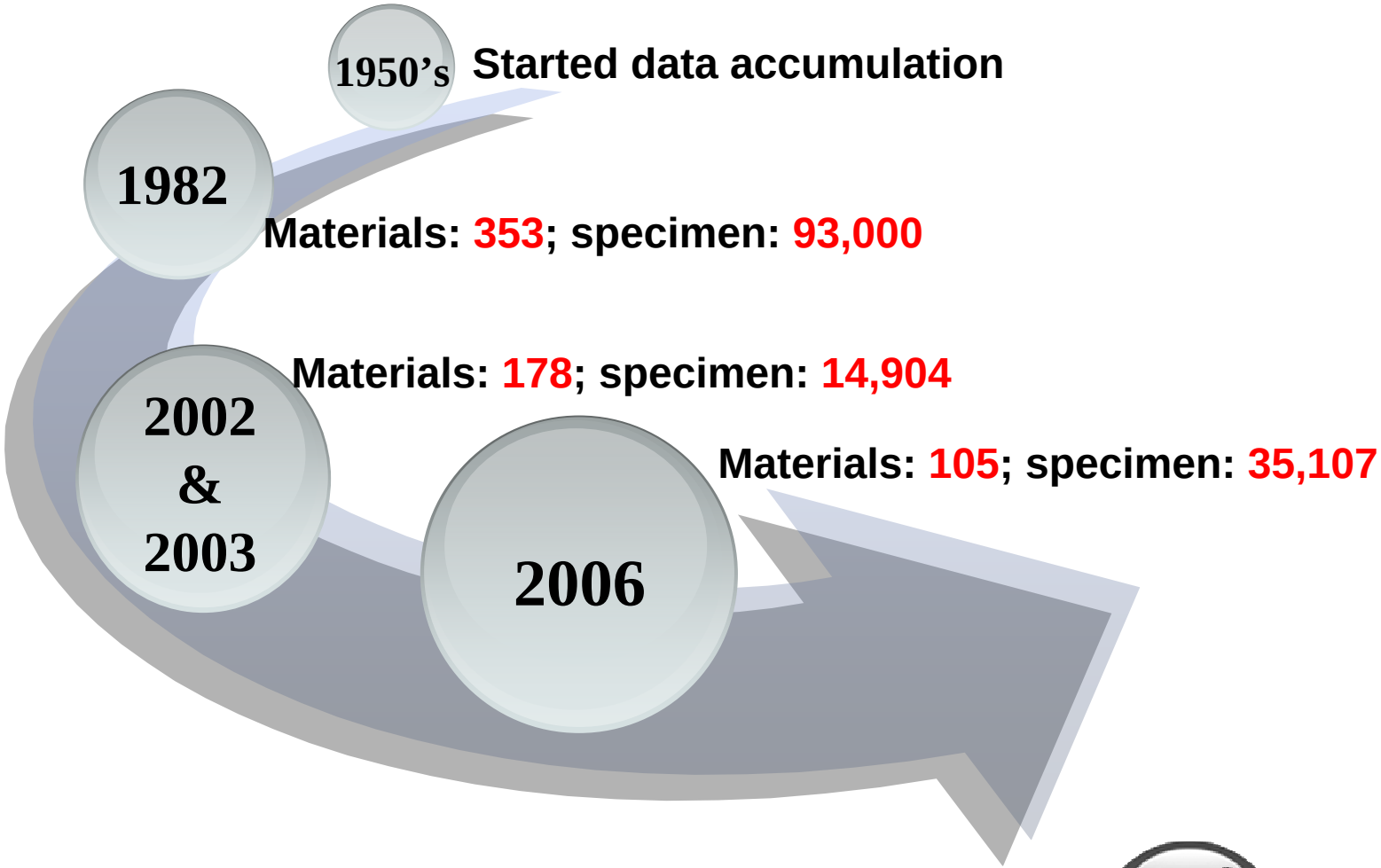
Introduction



Introduction

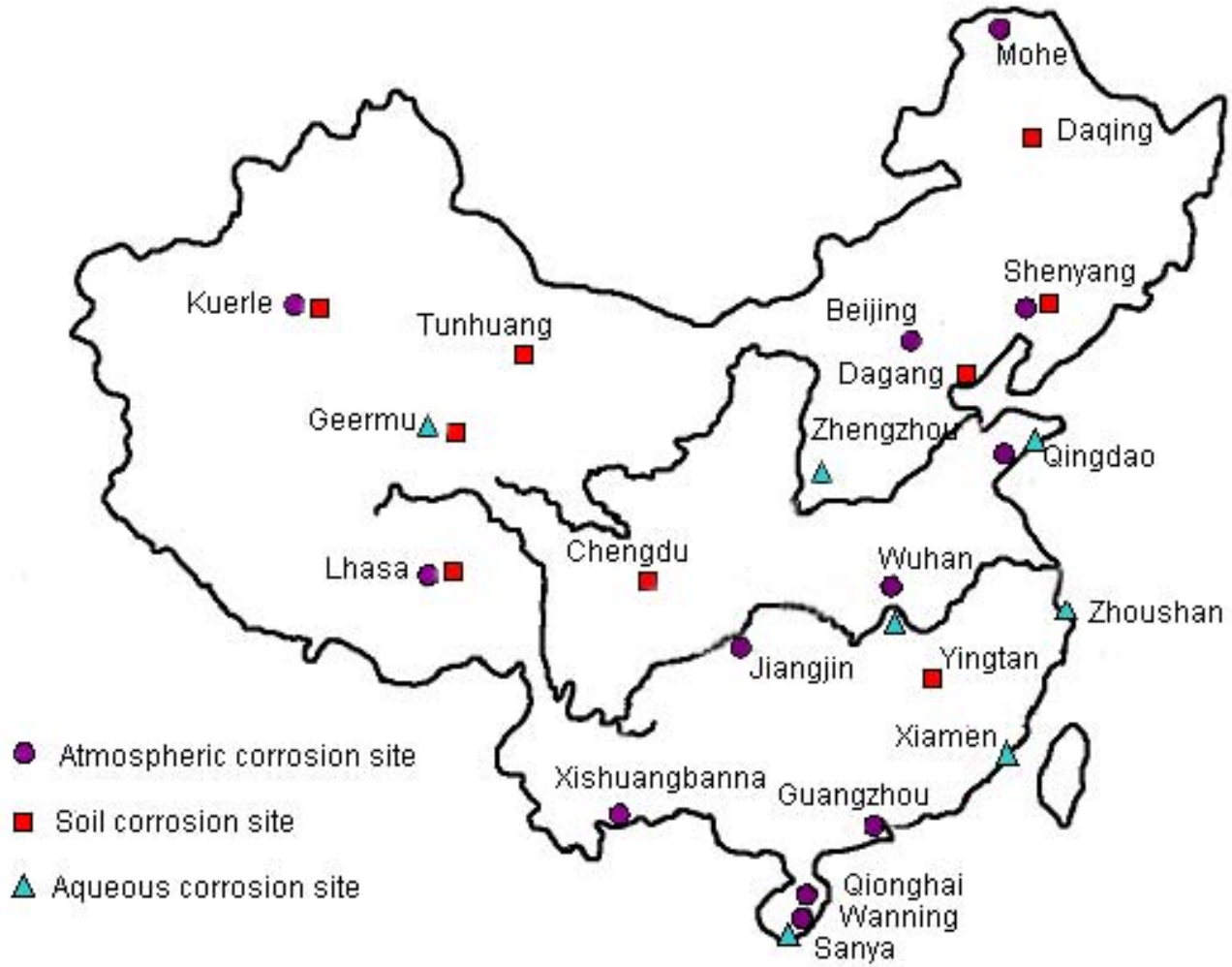


Fundamental Conditions



Network of Test site	General Category	Specific Type	Number of Types	Amount of Samples (piece)
Network of Atmospheric Corrosion Test Sites	Ferrous Metal	Carbon Steel, Low Alloy Steel, Stainless Steel	22	
	Nonferrous Metal	Copper, Aluminum, Titanium & Their Alloys	28	
	Protective Layers	Plated Metallic Layers & Organic Coatings	60	
	Polymer Material	Plastics, Rubbers, Paints & Adhesives	134/38	
	Sum	4 categories	244/38	59925
Network of Seawater Corrosion Test Sites	Ferrous Metal	Carbon Steel, Low Alloy Steel, & Stainless Steel	24	
	Nonferrous metal	copper, Aluminum, Titanium & Their Alloys	31	
	Plated/Coated Layers	Sprayed/Plated Metallic Layers & Organic Coatings	16	
	Sum	3 categories	71	11591
Network of Soil Corrosion Test Sites	Ferrous Metal	Carbon Steel (pipe, sheet) & Stainless Steel	6	
	Nonferrous Metal	Copper, Aluminum & Lead	3	
	Inorganic Material	Cement, Asbestos Cement & Concrete	7	
	Organic Material	Plastics, Pitch, Oiliness Hemp, Pyrocondensation Tube	7	
	Cable and Protective Layers	Urban Cables, Rural Cables, Coaxial Cables, Plastic Cable，Bare Lead and Alumna Painted Steel Belt, Plastic-coated Steel Wire	13	
	Optical Cable and Protective Layers	Optical Cables for Local and Long Distance Calls	2	
	Sum	6 categories	38	673
	Total Amount		353	93237

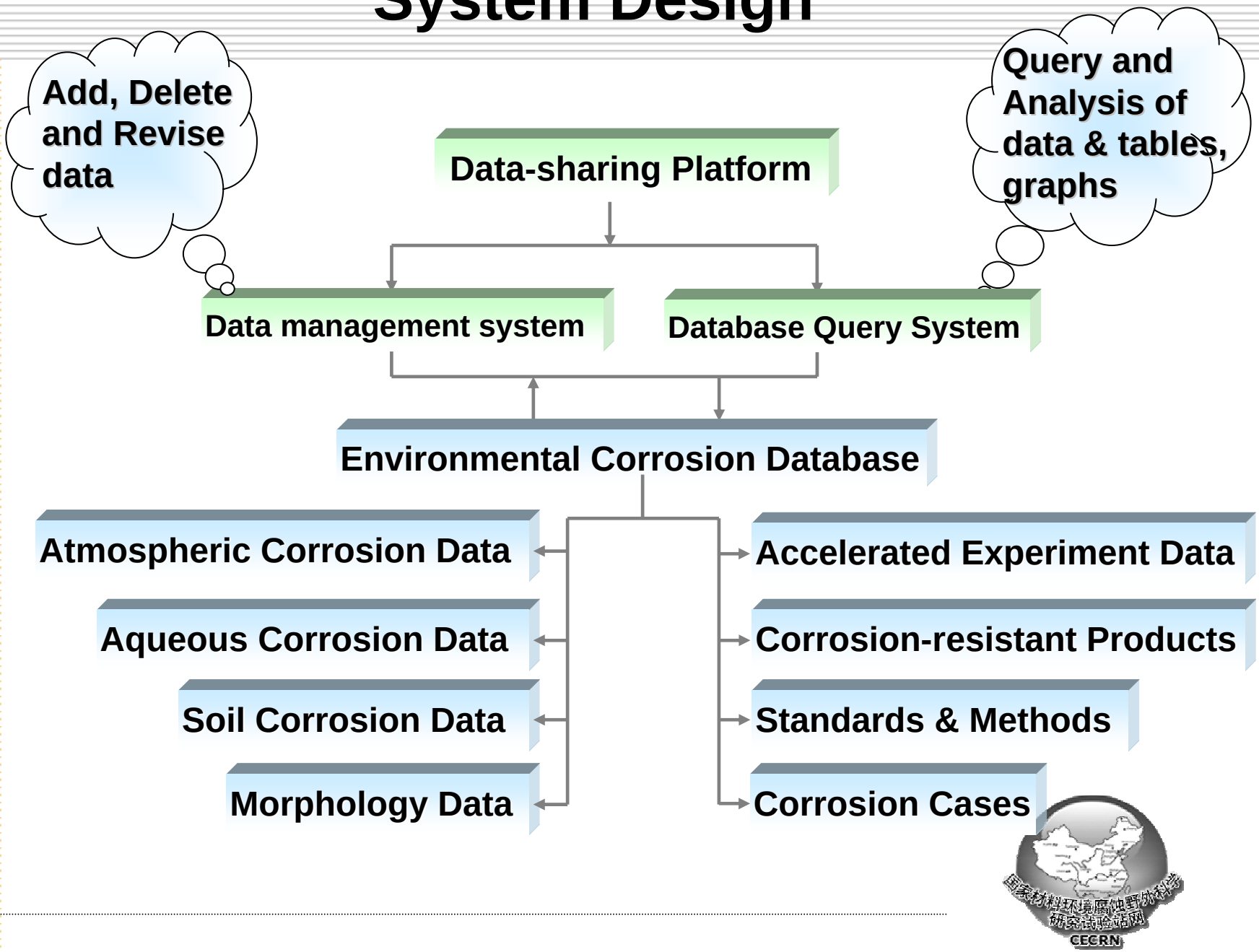
Fundamental Conditions - Site Distribution Map



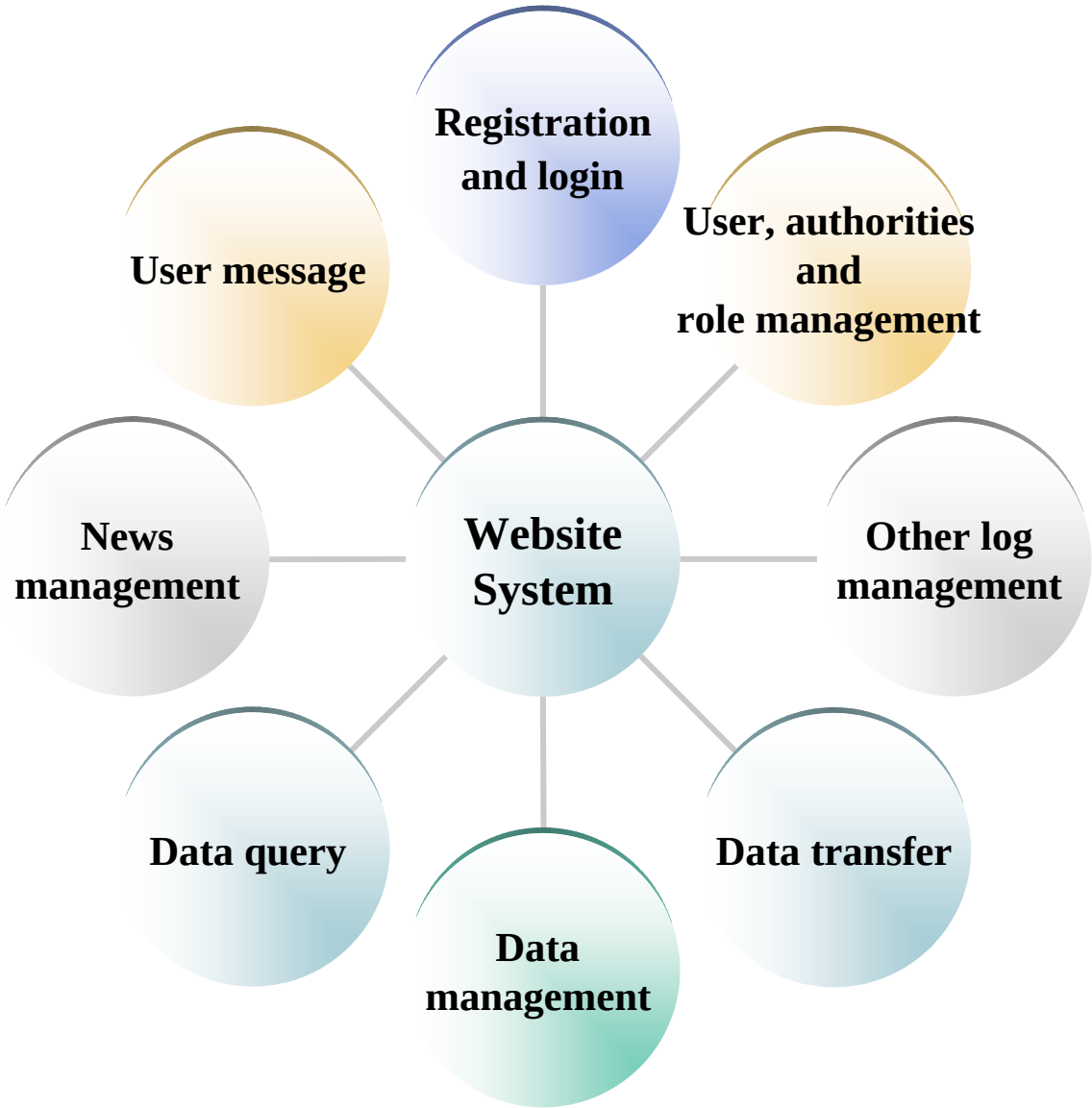
System Implement

- Operating system: Linux redhat
- Database system: Oracle9i
- Application software server: IBM Websphere application server
- Programming language： Java

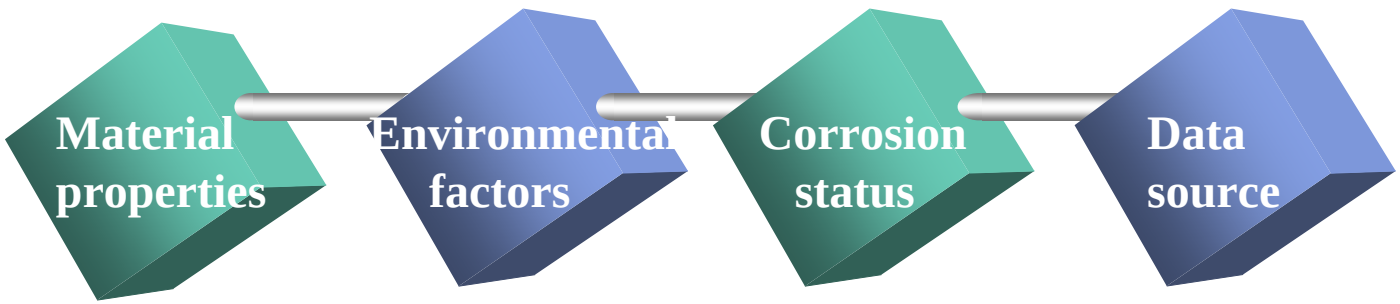
System Design



Data-sharing Network Construction

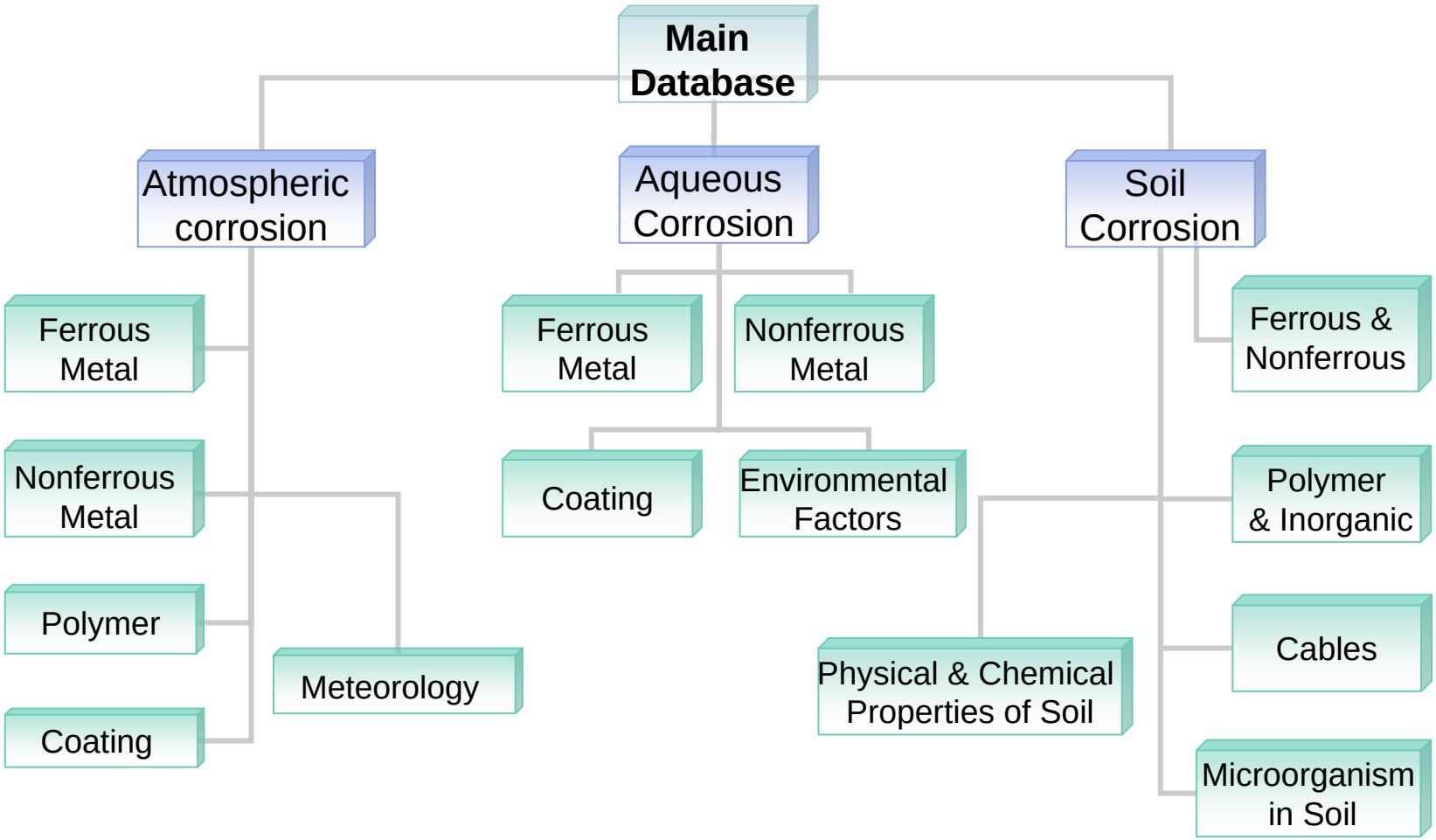


Database Design - Field Design



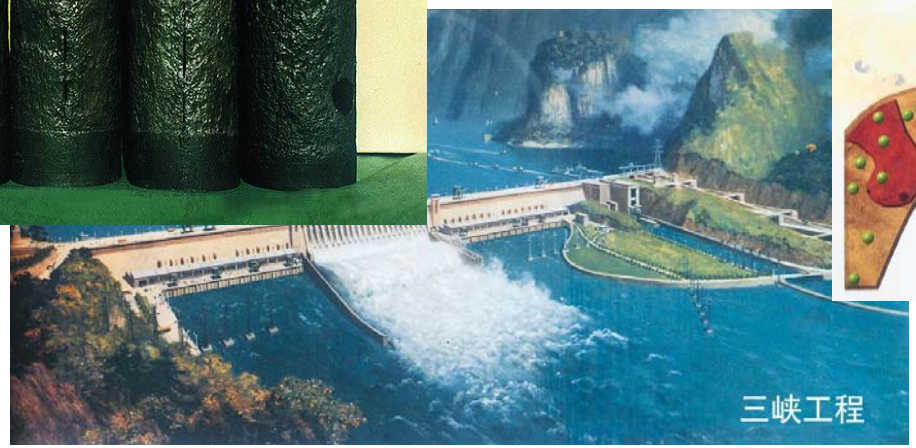
… size, weight, heat treatment status, chemical composition, appearance, and mechanical properties…	…temperature, humidity, meteorology factors, corrosion medium and pollutant…	…corrosion type, corrosion area, corrosion intensity, weight loss, corrosion rate, the maximum pitting depth…	…experimental site, data collection, analysis report, corrosion experiment criterion…

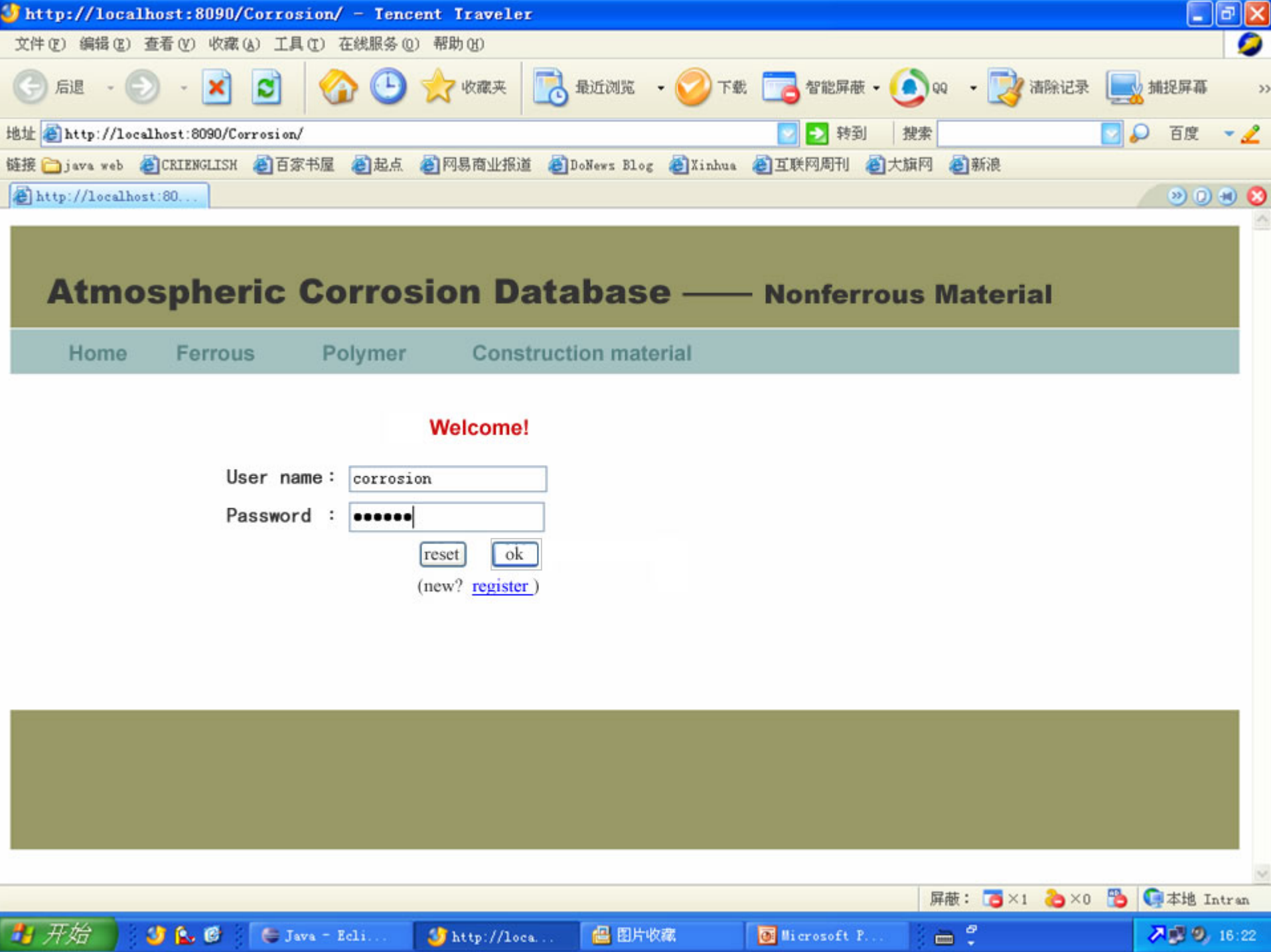
Database Design – Form design



Application Cases

- Sanxia Dam project
- Classification of soil corrosiveness in Dagang oil field
- Customized data system for BaoSteel




http://localhost:8090/Corrosion/ - Tencent Traveler
文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 在线服务(O) 帮助(H)
后退
收藏夹
最近浏览
下载
智能屏蔽
QQ
清除记录
捕捉屏幕
地址 http://localhost:8090/Corrosion/
转到
搜索
百度
链接 java web CRIENGLISH 百家书屋 起点 网易商业报道 DoNews Blog Xinhua 互联网周刊 大旗网 新浪
http://localhost:80...
Atmospheric Corrosion Database —— Nonferrous Material
Home
Ferrous
Polymer
Construction material
Welcome!
User name : corrosion
Password :
reset
ok
(new? register)
屏蔽: ×1 ×0
本地 Intran
开始
Java - Ecli...
http://loca...
图片收藏
Microsoft P...
16:22

Atmospheric Corrosion Database —— Nonferrous Material

Query pattren I :material

Aluminum
Forged Aluminum
Brass
Zinc

Query pattern II : project

the corrosion effect of pollutant ato
Corrosion data of nonferrous matal
Corrosion sensitivity of Al to Cl

Atmospheric Corrosion Database —— Nonferrous Material

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Aluminum
Forged Aluminum
Brass
Zinc

Query pattern II : project

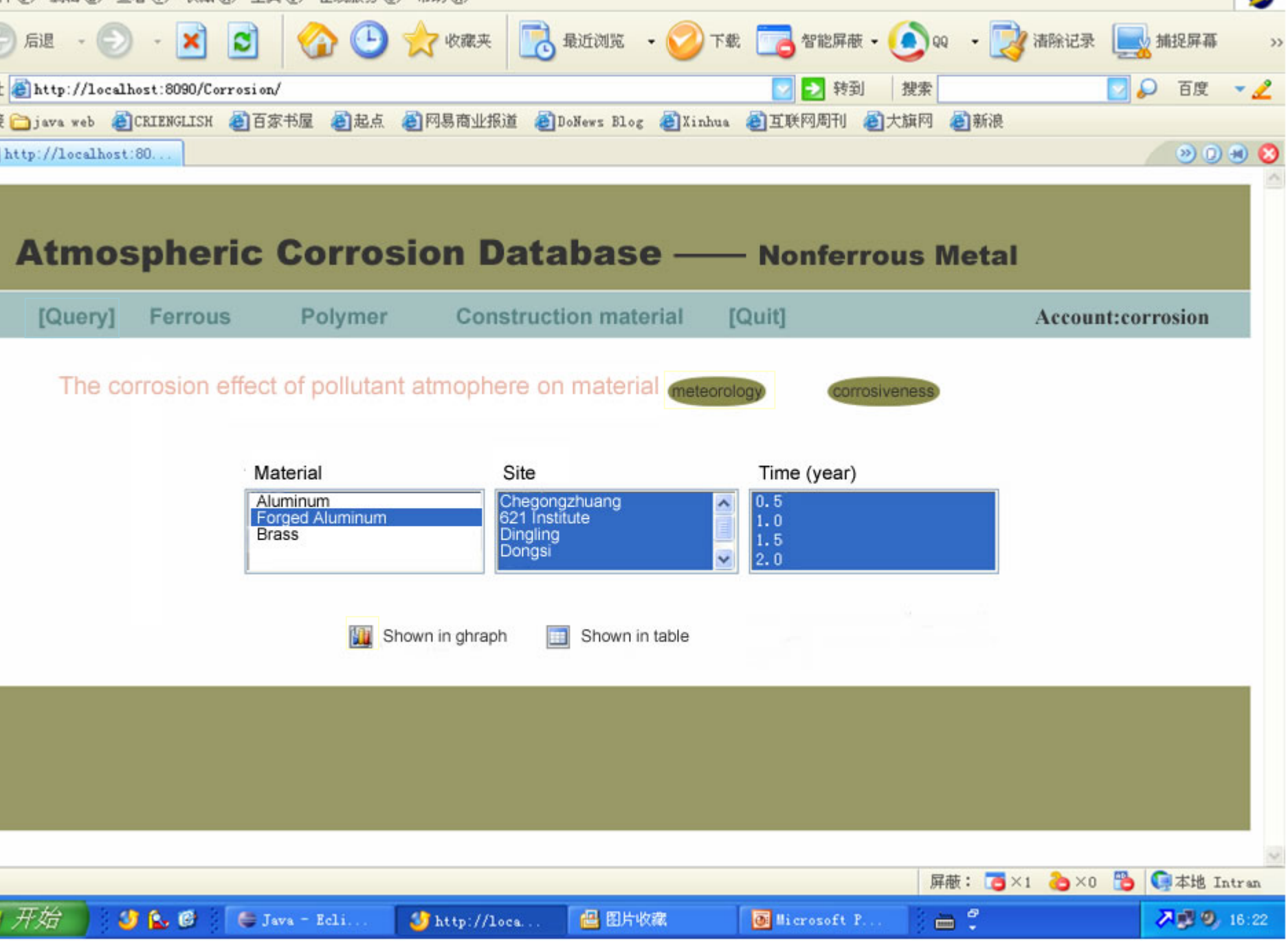
The corrosion effect of pollutant ato
Corrosion data of nonferrous matal
Corrosion sensitivity of Al to Cl

Atmospheric Corrosion Database —— Nonferrous Metal

The corrosion effect of pollutant atmophere on material meteorology corrosiveness

Material	Site	Time (year)
Aluminum Forged Aluminum Brass	Chegongzhuang 621 Institute Dingling Dongsi	0.5 1.0 1.5 2.0

Shown in ghraph Shown in table


后退
收藏夹
最近浏览
下载
智能屏蔽
QQ
清除记录
捕捉屏幕
http://localhost:8090/Corrosion/
转到
搜索
百度
java web
CRIENGLISH
百家书屋
起点
网易商业报道
DoNews Blog
Xinhua
互联网周刊
大旗网
新浪
http://localhost:80...
Atmospheric Corrosion Database —— Nonferrous Metal
[Query]
Ferrous
Polymer
Construction material
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Account:corrosion
The corrosion effect of pollutant atmophere on material
meteorology
corrosiveness
Material
Aluminum
Forged Aluminum
Brass
Site
Chegongzhuang
621 Institute
Dingling
Dongsi
Time (year)
0.5
1.0
1.5
2.0
Shown in ghraph
Shown in table
屏蔽：
×1
×0
本地 Intran
开始
Java - Ecli...
http://loca...
图片收藏
Microsoft P...
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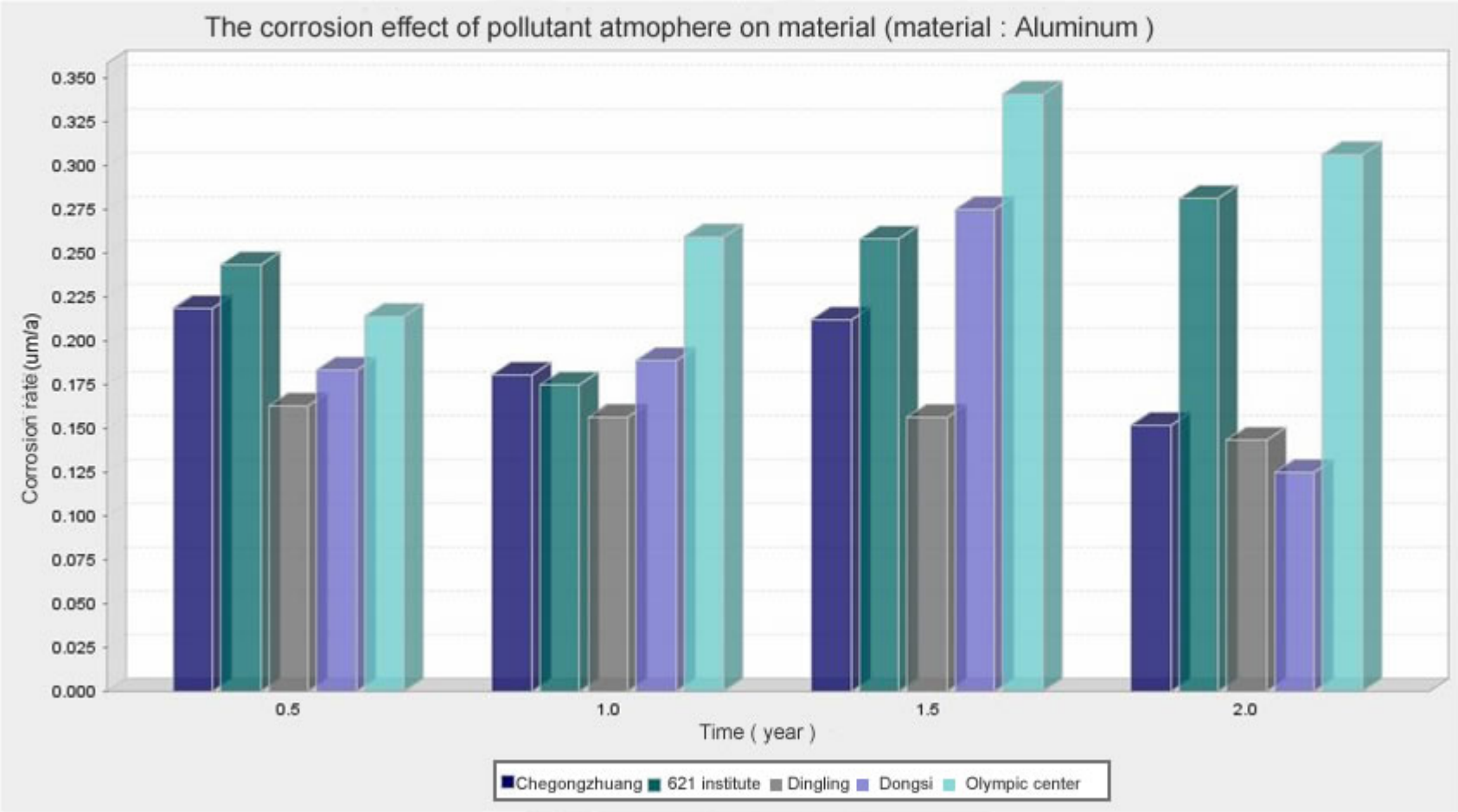


Atmospheric Corrosion Database —— Nonferrous Metal

The corrosion effect of pollutant atmophere on material

Back

Time	Site	Name of the meteorology factors table	Query
2001	Wanning	Annual report of the meteorology factors in Wanning (2001)	

Atmospheric Corrosion Database —— Nonferrous Metal

Annual Report of Meteorology Factors in Wanning (2001)

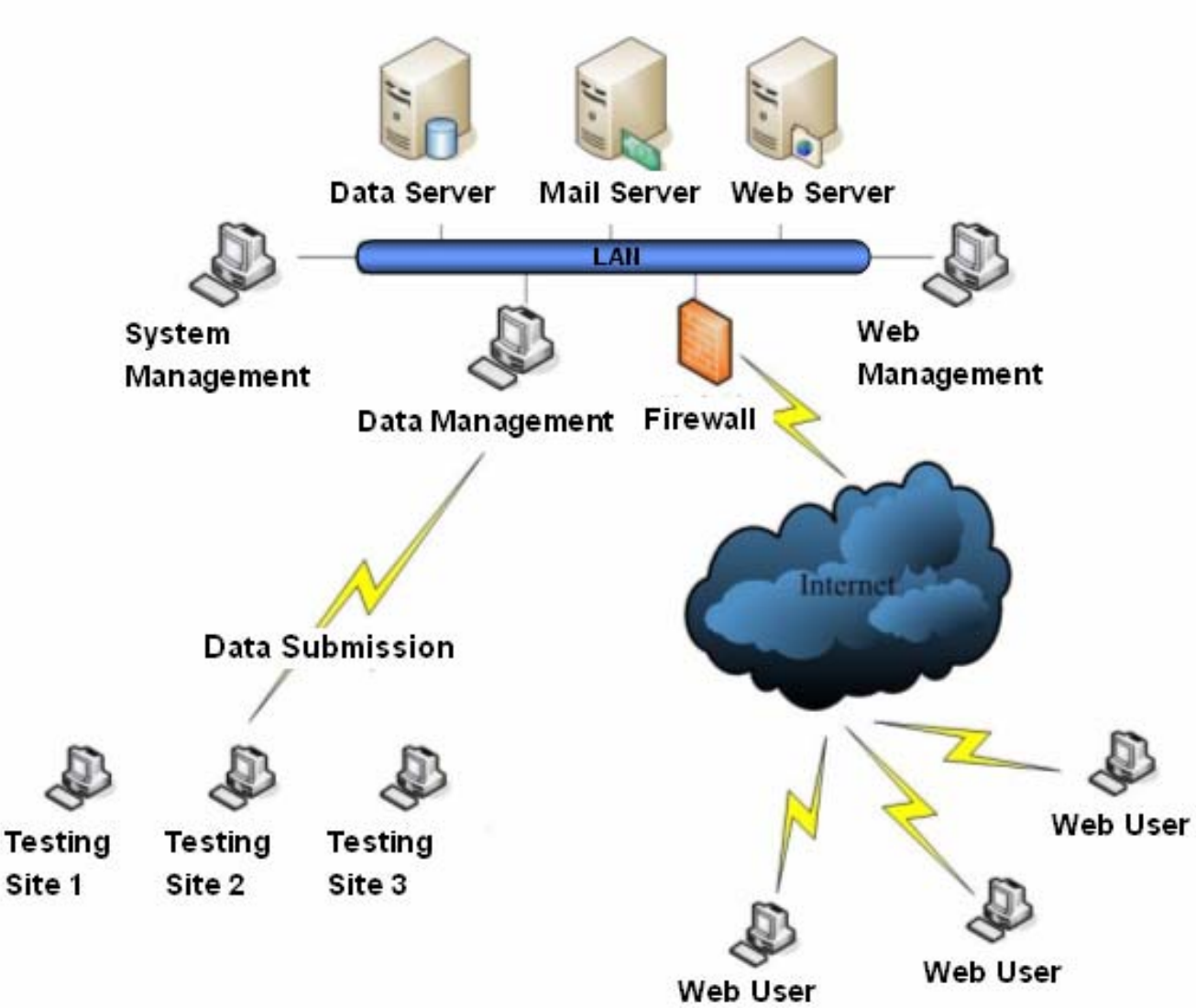
Back

Month	Exposure Site						Pressure (mb)			Height - 10 m		Sunlight		Precipitation (mm)	Hours of Precipitation (h)	Weather				
	Temperature (℃)			Comparative %			Avg.	Max.	Min.	Avg. Wind Vel. (m/s)	The Most Freq. Wind Direction	Sunshine Hours (h)	Percent %			Sun	Rain	Dew	Fog	Storm
	Avg.	Max.	Min.	Avg.	Max.	Min.														
1	20.5	29.6	12.6	91.0	100.0	68.0	1013.3	1020.8	1003.1	3.0	N	140.9	41	61.6	19.1		8.0	5.0	17.0	
2	20.8	27.6	13.9	90.0	100.0	60.0	1011.9	1020.2	1004.8	3.8	N	134.5	42	82.0	31.8		12.0	9.0	10.0	1.0
3	23.3	32.3	16.4	90.0	100.0	63.0	1011.6	1020.9	1002.9			180.0	48	111.4	27.1		15.0	17.0	12.0	1.0
4	26.4	33.4	16.4	89.0	100.0	59.0	1008.6	1016.9	999.6			265.1	70	9.5	2.5		5.0	24.0	15.0	
5	27.4	31.8	24.7	87.0	96.0	71.0	1005.4	1007.4	1003.4	1.6	SW	214.5	53	247.2	14.4		13.0	25.0	1.0	13.0
6	28.0	35.6	24.0	89.0	100.0	64.0	1002.8	1010.4	997.2	1.4	SW	187.5	47	153.7	22.8		11.0	19.0		8.0
7	28.5	35.0	24.3	87.0	99.0	58.0	1001.9	1009.0	991.9	1.6	SW	241.1	59	128.2	17.5		9.0	16.0	7.0	4.0
8	28.3	35.0	23.3	87.0	100.0	62.0	1002.8	1010.0	990.8	1.6	SW	243.7	62	525.0	45.3		12.0	19.0	15.0	9.0
9	27.5	33.0	23.5	86.0	100.0	57.0	1005.4	1011.0	999.0	1.8	SW	230.4	63	136.7	15.2		10.0	21.0	11.0	4.0
10	26.9	32.1	22.2	86.0	100.0	60.0	1011.2	1016.0	1006.9	2.9	N	198.4	55	417.8	44.6		16.0	12.0	10.0	6.0
11	22.3	30.1	14.3	82.0	100.0	49.0	1015.1	1023.4	1009.2	1.8	N	177.9	53	104.4	30.6		12.0	13.0	12.0	
12	20.6	27.9	10.6	90.0	100.0	52.0	1017.6	1019.8	1016.0	1.6	NE	102.6	30	324.3	68.3		17.0	8.0	10.0	
Avg./m	25.0	32.0	18.9	87.8	99.6	60.3	1009.0	1015.5	1002.1	1.8		193.1	52	191.8	28.2		11.7	15.7	10.0	3.8

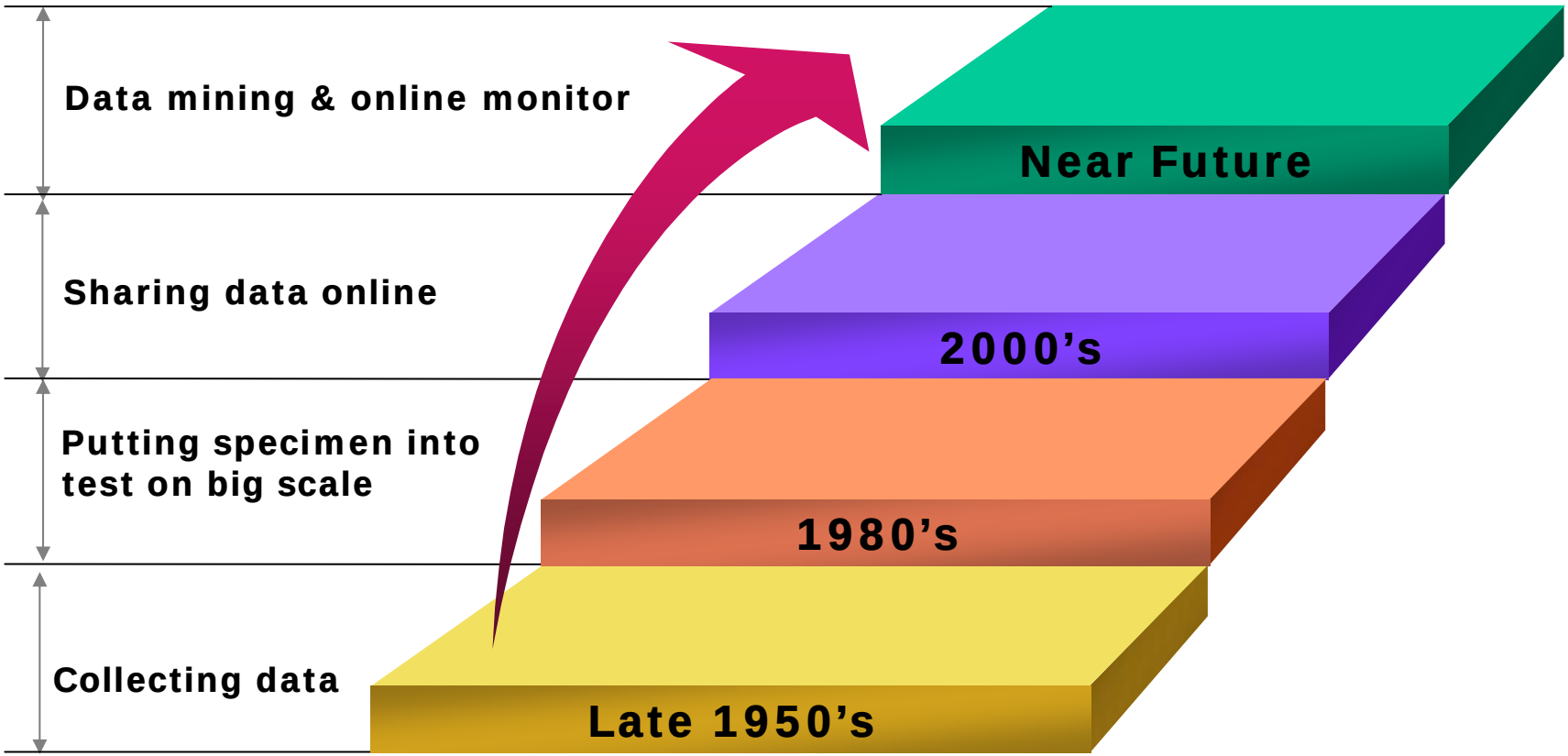
Summary

- More than 400 thousand data
- the measurement of atmospheric and seawater corrosions lasted for 8-10 years and that for alkaline soil corrosion lasted for 30-50 years.
- Those data of different materials are classified into six categories (ferrous metal, non-ferrous metal, concrete, polymer, cable and optical cable), which was verified by corrosion specialists and can be further used in practice.
- the corrosion-resistant performance of different materials in various environments and the related corrosion principles have been concluded, which provide important references for the material selection and corrosion estimation.
- Twelve experimental methods for atmospheric corrosion and seawater corrosion have been regulated into national standards.

Summary & Prospect



Summary & Prospect



Acknowledgement

Financial Support from:

- **the Ministry of Science and Technology of P. R. China**

- **the National Natural Science Foundation of China (NSFC)**

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Thank you very much!