Newsletter of China-EU Project

中欧项目通讯（eco2adapt）

典型森林生态系统韧性调控机制与适应性管理项目
Regulation Mechanism of Ecosystem Resilience and Adaptive Forest Management (2023YFE0105100)

第二期
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国家重点研发计划政府间国际科技创新合作项目（2023YFE0105100）

中方项目进展
China Project Progress

中欧合作 Eco2adapt 项目启动会在京召开

2023 年 10 月 24 日–25 日，中国林业科学研究院在京召开森林生态系统韧性调控机制与适应性管理国际研讨会暨中欧合作 eco2adapt 项目启动会。来自中国林科院、浙江农林大学、国际竹藤中心、中国科学院华南植物园、中南林业科技大学、北京大学、东芬兰大学、全球气候论坛、法国农业食品环境研究院等 16 家单位、近 70 位中欧专家出席了会议，以气候变化下的森林韧性为主要议题，针对森林生态系统韧性调控机制和路径、监测评价与预警、森林适应性管理以及政策机制等方面进行了富有成效的分享和深入交流。

中欧合作 eco2adapt 项目启动会在京召开
eco2adapt - China Project kicked off in Beijing

中方项目 6 位任务负责人介绍了任务各团队的研究基础、主要内容、实施计划和团队人员，提出了今后研究面临的挑战及可能的解决方案。欧方项目 7 位任务负责人分享了前期的研究进展。基于分享和交流，中欧双方提出了需要进一步加强合作的领域和方向，三个任务直接实现了中欧合作对接的目标，其他四个任务的合作意向将进一步通过会议、邮件等方式予以落实。来自中国科学院华南植物园、国际竹藤中心和中国林科院的 6 位青年研究人员分享了他们在森林韧性方面的阶段性研究成果，有助于双方进一步深入开展合作研究。

庞勇研究员介绍项目计划
Project Leader Prof. Yong PANG briefed the project

Eco2adapt - China Project Kicked off in Beijing

On October 24th-25th 2023, Chinese Academy of Forestry (CAF) hosted the International Workshop on Regulation Mechanism of Ecosystem Resilience and Adaptive Forest Management & Kick-off Meeting of eco2adapt-China Project. Nearly 70 Chinese and European scientists from 16 organizations, including CAF, Zhejiang Agriculture and Forestry University (ZAFU), International Center for Bamboo and Rattan (ICBR), South China Botanical Garden of Chinese Academy of Sciences (SCBG), Central South University of Forestry and Technology, Peking University, University of Eastern Finland, Global Climate Forum and INRAE, participated in this workshop. Themed with forest resilience under climate change, the workshop had fruitful sharing and in-depth exchanges on regulation mechanism of and pathways to ecosystem resilience, monitoring, evaluation and early warning techniques, adaptive forest management and policy regime.

The six task leaders from the China Project briefed the rationale, basis and contents of their research as well as the task implementation plan and team members, and put forth the potential challenges and possible solutions. The 7 working package (WP) leaders from the EU Project also shared the research progress after their project kicked off. With the communication and exchanges, Chinese and EU WP leaders discussed the priority areas of and pathways to future cooperation. Three tasks of the China Project achieved the partnering with EU counterparts, and the others were encouraged to build the partnering through meetings, emails and other means. Six Chinese scientists from SCBG, ICBR and CAF shared their research on forest resilience, which was expected to contribute to future cooperation.

中欧专家到河北木兰林场调研森林经营

2023 年 10 月 26 日，项目组织启动会的参会人员到任务 6 负责的研究示范区——河北省木兰围场国有林场（简称木兰林场）开展森林经营现场调研。木兰林场场长田国恒全程陪同调研。

一行二十余位中欧专家参观了中国北方森林经营实验示范区，木兰林场王辉高工现场讲解了木兰林场近自然育林实践及典型示范模式，包括：落叶松人工林均质经营、以目标树为构架的全林经营、绿化苗木基地和矮林转化经营。专家学者就目标树培育、天然更新以及计划在木兰开展的科学实验进行了交流讨论。

专家们还参观了木兰林场生态建设宣教基地，全面了解了木兰林场自建场以来的森林经营理念与技术变革、实践进展及成效、政策扶持等内容。

Field Trip to Mulan Forest

On October 26th 2023, the eco2adapt-China Project organized the participants who had attended the kick-off meeting to join the field trip to the Mulan Weichang State-owned Forest Farm in Hebei Province (hereafter referred to as Mulan Forest), which is one of the living labs of the project. Task 6 led by the Research Institute of Forestry Policy and Information of the CAF is responsible for this living lab.

Accompanied by Mr. Guoheng TIAN, Director of Mulan Forest, over 20 Chinese and European participants visited the experimental demonstration area which showcases the management of forests typical in Northern China. Mr. Hui WANG, a senior engineer from Mulan Forest, introduced four typical forest management models, which have applied the innovative practices of close-to-nature forest management, including: (1) the even-aged management of planted *Larix* forests; (2) selection forest management targeting crop trees; (3) seedling management base for landscaping; and (4) coppice-conversion-prioritized management. The experts and scholars exchanged ideas on crop tree management, natural regeneration, and scientific experiments to be conducted in Mulan Forest. They also visited the Exhibition Hall of Mulan Forest, gaining a comprehensive understanding of the history of Mulan Forest as well as the changes in forest management concepts and technological system, the progress and effectiveness in on-site work and public policy support among others since the establishment of Mulan Forest.

中欧专家参观在落叶松林推行的
以目标树为架构的全林经营示范点
The visit to a demonstration area on selection forest management of *Larix* stands

王辉高工现场讲解了木兰林场近自然育林实践及
典型示范模式
Senior engineer Hui WANG from Mulan Forest, introduced four typical forest management

中方项目进展
China Project Progress

佛罗伦萨大学 Forzieri 教授来华交流森林韧性遥感监测评估工作进展

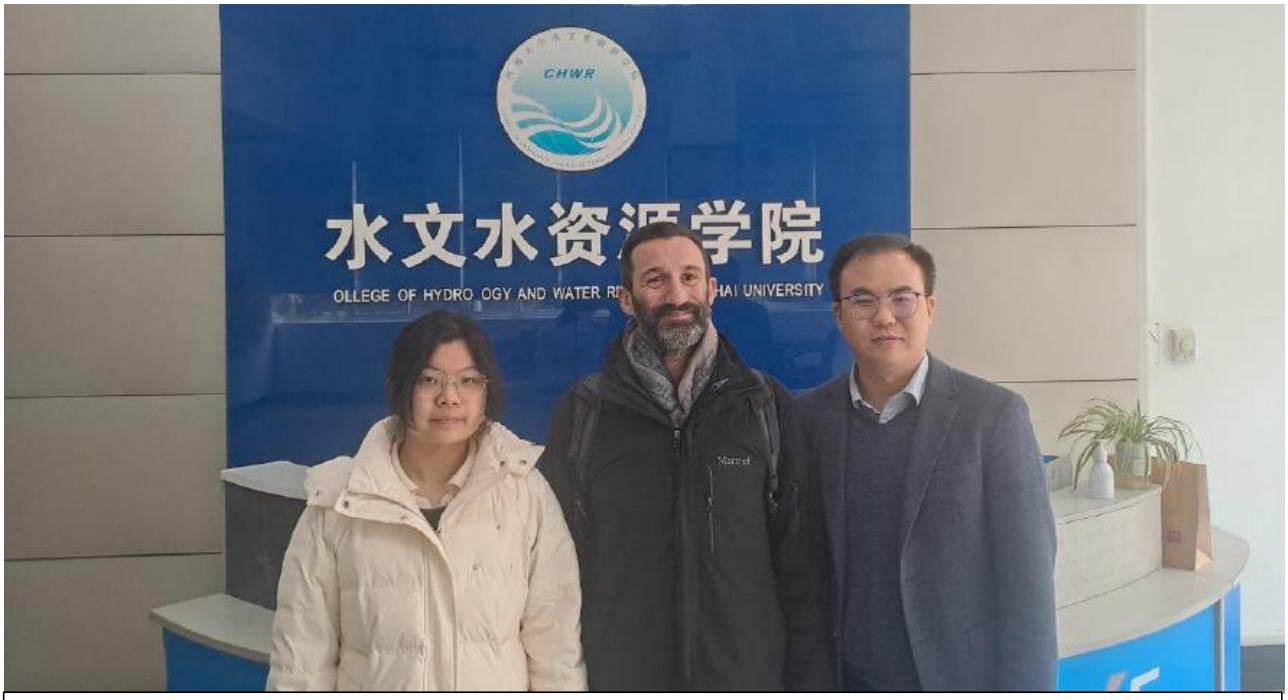
2023 年 12 月 14 日，欧方项目 WP3 和 WP4 佛罗伦萨大学 Forzieri 教授来华交流森林韧性遥感监测评估工作进展，与中国林业科学研究院资源信息研究所余涛副研究员在南京进行了交流。中国林业科学研究院庞勇研究员、浙江农林大学陈广生教授参加了线上会议。

中欧双方交流了森林韧性遥感监测评估的近期工作进展，并就森林扰动和森林韧性遥感评估模型构建、韧性趋势分析、青年学者交流等中欧双方的共同兴趣点、后续合作的方向，进行了交流讨论。

Exchange with Prof. Forzieri from Italy on Remote Sensing Monitoring of Forest Resilience

On December 14th, 2023, Prof. Forzieri from Florence University came to Nanjing in China, to brief the progress on WP3 and WP4 of the EU Project, and made exchanges with Dr. Tao YU, Associate Researcher from the Institute of Resources Information of Chinese Academy of Forestry, on remote sensing monitoring and evaluation of forest resilience. Prof. Yong PANG from CAF and Prof. Guangsheng CHEN from ZAFU participated online.

The both sides briefed the recent progress in remote sensing monitoring and evaluation of forest resilience, and discussed the common interests and follow-up cooperation in such fields as the construction of remote sensing assessment model for forest disturbance and forest resilience, analysis of forest resilience dynamics, scholar exchange fellowship, et al.



余涛副研究员与 Forzieri 教授在南京河海大学开展交流
Discussion between Dr.Tao YU and Prof. Giovanni Forzieri in Hohai University, Nanjing

任务 1 团队在川西开展野外调查取样

2023 年 8 月 14–19 日，任务 1 负责人尚鹤研究员团队前往甘孜藏族自治州雅江县开展林火干扰对高山松林影响的样品采集工作。在雅江县共设置 7 个样点，每个样点设置 3 个 20×20m 样地（其中一个样点只设置了 2 块样地），共计 20 个样地，包括未受林火干扰的对照样地以及林火干扰时间分别为 2009 年、2013 年、2017 年、2018 年的干扰样地。共采集土壤样品 280 个，凋落物样品 120 个，后续将开展土壤种子库、土壤养分、土壤微生物、凋落物养分等分析。

Task 1 Collected Samples in Western Sichuan

On August 14th-19th, 2023, Prof. He SHANG, the Task 1 leader, went to Yajiang County in Ganzi Xizang Autonomous Prefecture with his team to carry out sample collection to understand the influence of forest fire disturbance on alpine pine forest. There are 7 sampling sites in Yajiang County, and 3 20 x 20m sample plots in each sampling site, totaling 20 sample plots (one of the sampling sites has only 2 sample plots). The sample plots include those in unburned control alpine pine forest and in the forests which had been burned in 2009, 2013, 2017 and 2018, respectively. A total of 280 soil samples and 120 samples of litters were collected, which will be used for analyzing soil seed bank, soil nutrients, soil microorganisms and litter nutrients.

团队开展野外调查取样
Field investigation and sampling

中方项目“生活实验室”（上）
Living Labs in China (Part A)

Living Lab: 川西实验区

位于四川省甘孜藏族自治州雅江县的高山松林

研究背景：四川省的森林资源十分丰富，是我国主要林区和重点火险区，近年来，尤其是川西地区受“暖干化”气候影响，加之林下可燃物逐年累积，雷击火时有发生。高山松林是川西高山亚高山地区的主要森林类型，由于海拔高，冬春干旱等气候特点加之部分人为干扰，火灾频发。森林火灾影响包括大量的树木烧毁，林分密度降低，土壤中的有机质烧毁进而导致土地沙化和水土流失，土壤中大量的生物和微生物被烧死进而破坏了林区的生态平衡，使得林区及其周围地区的气象和环境变得十分恶劣。

预期成效：在 2018 年调查基础上对植被和土壤养分进行复查。同时对树木年轮、凋落物养分、凋落物/土壤种子库、土壤微生物、生态系统各组分碳库开展研究。该研究可揭示林火干扰对高山松林的影响及其恢复机制，为阐明干扰下森林生态系统的韧性反馈机制提供科学依据和数据支撑。

样地分布图
Distribution map of sample plots

Living Lab: Western Sichuan

Pinus densata forest located in Yajiang County, Ganzi Xizang Autonomous Prefecture, Sichuan Province

Expected Results

Sichuan is one of the provinces where fires have occurred the most frequently with large burned forest area, while Ganzi Prefecture is one of the most affected regions. Investigations on vegetation and soil nutrients will be conducted based on the previous investigation in 2018. We will analyze the effects of forest fire on tree rings, litter nutrients, litter/soil seed banks, soil microorganisms and carbon pools of ecosystem components. This research is expected to reveal the impacts of forest fire disturbance on alpine pine forests and its restoration mechanism, and provide scientific evidence and data support to elucidate the resilience feedback mechanisms of forest ecosystems to fire disturbance.

2018 年森林火灾（半年后）
Burned in 2018 (0.5 year after fire)

2018 年森林火灾（5 年后）
Burned in 2018 (5 years after fire)

中方项目“生活实验室”（上）
Living Labs in China (Part A)

Living Lab: 海南霸王岭实验区

位于海南省昌江县和白沙县境内，是海南岛典型的热带林林区，也是全球最濒危灵长动物海南长臂猿（*Hylobateshainanas*）的唯一分布区。

主要功能：依托 2019 年建立的海南霸王岭森林生态系统定位观测研究站，借助自 2009 年至今连续 15 年的森林动态监测成果，围绕森林生态系统结构与功能开展热带天然林生物多样性与生态系统功能动态关系以及热带天然林经营体系研究。

预期成效：研究团队针对不同干扰方式、不同恢复阶段的 31 个 1 公顷样地（图 A）以及热带次生林经营抚育样地（图 B、C）开展群落调查、环境因子调查、植物功能性状收集与测定以及样地复查调查，形成自 2009 年以来连续 10～15 年的森林动态监测数据。该项工作的开展能够为阐明不同干扰方式对海南热带天然林群落的影响提供基础数据，并可用于揭示不同空间尺度上的森林生态系统韧性的影响因素及其变化特征。

Picture B. 热带次生林经营抚育样地关键热带生态功能树种保护
Conservation of key species for tropical ecological functions and sample plots for the management of secondary tropical forests

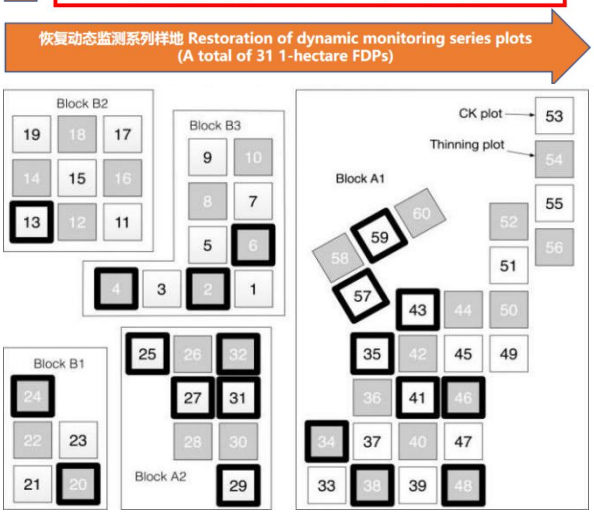
Living Lab: Bawangling Experiment Forest

Located in Changjiang County and Baisha County of Hainan Province. It boasts a typical tropical forest of Hainan Island, and it is also the only distribution area of Hainan gibbon (*Hylobateshainanas*), the world's most endangered primate.

Expected Results

The research team conducted community surveys, investigated environmental factors, collect & determine plant functional traits in 31 one-hectare plots (Picture A) which are at different disturbance regimes and recovery stages, as well as investigating the ecological restoration of tropical secondary forest plots (60 0.25-hectare plots, Picture B/C). Field investigations were carried out to generate continuous forest dynamic monitoring data spanning 10 to 15 years since 2009. The field work can provide data for elucidating the impacts of various disturbance regimes on the natural tropical forest communities in Hainan Island. It can also be used to reveal the influencing factors to forest ecosystem resilience at different spatial scales and their variation characteristics.

Picture A. 31 个 1 公顷样地 31 one-hectare plots



Picture C. 热带次生林经营抚育样地 ecological restoration of tropical secondary forest plots

中方项目“生活实验室”（上）

Living Labs in China (Part A)

Living Lab: 宝天曼实验区

地处伏牛山南麓，属于暖温带向北亚热带过渡区域，以栎类为优势物种的典型落叶阔叶天然林生态系统。

研究背景：宝天曼天然林具有原始性和古老性。作为我国东部南北森林样带中部为数不多的“天然物种宝库”，其气候和植物具有南北过渡的特性。天然林对气候变化的响应机制和生物多样性维持机制值得研究。

预期成效：利用通量塔以及对模拟气候变化的控制实验样地开展的监测和研究，形成1套森林生态基础监测数据集，进一步揭示宝天曼天然林对干旱、增温的响应和适应机制。

Living Lab: Baotianman Experiment Forest

Baotianman is located in Nanyang of Henan Province, the southern foothills of the Funiu Mountains in China. It is in the transitional belt from the warm temperate zone to the northern subtropical zone, typically with deciduous broad-leaved natural forests dominated by the species of oak.

Expected Results

The primitive forest at Baotianman is one of few natural species reservoirs in China. Using flux tower, the team will conduct monitoring and research on experimental plots under simulated climate change to build up one set of basic monitoring data-set of forest ecosystem, and thus to reveal the response and adaptation mechanisms of natural forests in Baotianman to drought and warming.

通量塔
Flux tower

减雨控制实验样地
The experimental platform for manipulative through fall reduction

宝天曼森林生态系统研究站
The main station building of Baotianman Forest Ecosystem Research Station

中方项目“生活实验室”（上）

Living Labs in China (Part A)

Living Lab: 木兰林场实验区

中国河北省木兰围场国有林场以落叶松、油松为主的温带针叶人工林

研究背景：由于干旱、病虫害、沙尘暴等自然灾害干扰，加上长期沿用传统的“用材林轮伐轮造”经营模式，导致人工针叶纯林多、树种单一（以落叶松、油松为主），林龄小、径级小、生态功能低下、生物多样性低，易受到自然灾害和人为干扰的影响。

预期成效：通过开展落叶松和油松人工林生态系统韧性、林分生长动态模拟、不同森林经营模式的成本效益分析等研究，提出温带地区典型人工林生态系统韧性与质量提升技术模式，并在试验区示范新的森林经营实践，与对照区相比，改善林龄结构、径级结构，提升林分稳定性、丰富生物多样性、提高林地生产力，在不考虑木材价格的影响下林分经济价值提升 5~10%。

Living Lab: Mulan Forest

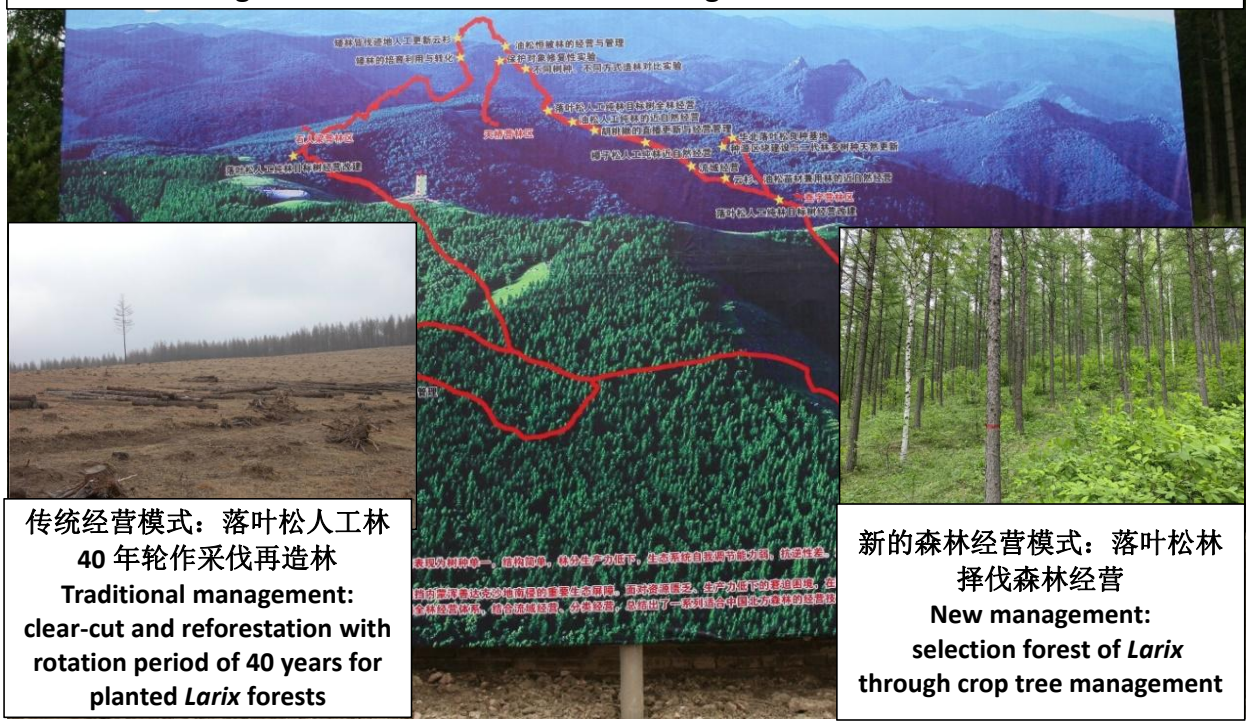
Planted temperate coniferous forest dominated by *Larix principis-rupprechtii* and *Pinus tabuliformis*, located in Mulan Weichang State-owned Forest Farm in Hebei Province, China (Hereinafter referred to as Mulan Forest)

Expected Results

The living lab will be applied to conduct research on the resilience of planted forests dominated by *Larix principis-rupprechtii* and *Pinus tabuliformis*, simulation of forest growth dynamics, and cost-benefit analysis of various forest management options. It aims to propose a technical model for improving the resilience and quality of typical planted forests in temperate region, and demonstrate the new forest management models in the living lab. Compared to the control area, forests in the project area are expected to have improved structures of age and diameter, enhanced stand stability, enriched biodiversity and increased forest productivity, and hence have the economic value increased by 5-10% without considering the impact of wood prices.

木兰林场试验区- 森林经营示范区

Living Lab of Mulan Forest - forest management demonstration area



传统经营模式：落叶松人工林40 年轮作采伐再造林

Traditional management: clear-cut and reforestation with rotation period of 40 years for planted *Larix* forests

新的森林经营模式：落叶松林择伐森林经营

New management: selection forest of *Larix* through crop tree management

学术活动
Latest Academic Events

中方项目负责人出访欧方合作单位

2023 年 10 月 8 日–19 日，中国林科院储富祥院长率项目组成员贾宏炎、庞勇（中方项目负责人）、吴水荣（任务 6 负责人）、余涛一行 5 人访问了法国农业食品环境研究院（INRAE）、东芬兰大学（UEF）、欧洲森林研究所（EFI）、罗马尼亚布拉索夫特兰西瓦尼亚大学，并实地调研考察了中欧 eco2adapt 项目的三个实验区（法国 Landes 人工林试验区、芬兰野外林火实验区、罗马尼亚 Ledera 天然更新阔叶林实验区），就 eco2adapt 项目合作、青年学者交流访问等方面进行了深入交流。

代表团访问了 INRAE 在蒙彼利埃的植物学与植物模型联合实验室（AMAP Lab），与欧方 Alexia Stokes 教授（项目负责人、WP7 负责人）、Zhun MAO 副教授（WP7 负责人）针对当前项目的工作进展、后续的合作模式、合作重点开展了交流。随后，访问了位于法国波卡基林区的 Landes 人工林实验区。该实验区位于欧洲面积最大的人工林区，主要树种为海岸松，管理方式为人工集约化经营管理。通过参观生物多样性、病虫害防治、多目标经营观测的野外设施，了解了大面积人工针叶林中重建阔叶树联通廊道的做法及其生态效应。

东芬兰大学（UEF）（WP1 负责单位），代表团与 Frank Berninger 教授（WP1 负责人）就“WP1–创新社会交流机制，促进森林韧性提升”的当前进展、后续合作计划进行了交流欧洲林业研究所（EFI）（WP6 负责单位）、芬兰自然资源研究所、Bitcomp 公司（WP1、 WP3、WP5 参加单位）也参与了交流讨论。之后前往芬兰野外森林试验区进行了调研，先后考察了林火试验区、小蠹虫爆发试验区以及 Koli 自然保护区，并调查育林多样化如培育恒续林、混交林等是否会减缓气候变化引起的森林脆弱性。

东芬兰大学（UEF）（WP1 负责单位），代表团与 Frank Berninger 教授（WP1 负责人）就“WP1–创新社会交流机制，促进森林韧性提升”的当前进展、后续合作计划进行了交流欧洲林业研究所（EFI）（WP6 负责单位）、芬兰自然资源研究所、Bitcomp 公司（WP1、 WP3、WP5 参加单位）也参与了交流讨论。之后前往芬兰野外森林试验区进行了调研，先后考察了林火试验区、小蠹虫爆发试验区以及 Koli 自然保护区，并调查育林多样化如培育恒续林、混交林等是否会减缓气候变化引起的森林脆弱性。

代表团与 AMAP 实验室各成员单位代表合影
Group photo with the representatives of the AMAP laboratory

▲Inter-organizational Exchanges between China and EU Project Implementers

Upon the invitation of Prof. Alexia Stokes from the INRAE, Prof. Frank Berninger from the University of Eastern Finland, and President Abrudan Ioan Vasile of the University of Transylvania, Romania, Prof. Fuxiang CHU, President of the Chinese Academy of Forestry, led the delegation of the eco2adapt-China Project members comprising Prof. Hongyan JIA, Dr. Yong PANG (project leader), Dr. Shuirong WU (leader of Task 6) and Dr. Tao YU, to visit France, Finland and Romania from October 8th to 19th, 2023. They visited the INRAE, the UEF, the EFI and the University of Transylvania. Also they made field trips to three living labs of the EU Project, i.e., Landes plantation in France, field wildfire living lab in Finland, and the Ledera Naturally Regenerated Broad-leaved Forest in Romania. Prof. CHU and the other delegates had in-depth exchanges with the above-mentioned organizations on scientific research, technical application, industry promotion, personnel exchange and project cooperation, reaching a number of consensus for future cooperation.

访问 Landes 人工林实验区
A visit to the Landes plantation

在东芬兰大学座谈交流 Discussion and exchange at the University of Eastern Finland

考察芬兰林火试验区
A visit to the Finnish forest fire living lab

访问欧洲林业研究所
A visit to the European Forest Institute

代表团与 Abrudan Loan Vasile 校长座谈并留影
Group photo with President Abrudan Ioan Vasile

代表团访问 Ledera 天然更新阔叶林实验区
A visit to the living lab of Ledera Naturally Regenerated Broad-leaved Forest

学术活动
Latest Academic Events

任务 3 浙江农林大学团队成功组织 COP28 边会

浙江农林大学周国模教授和梅婷婷副教授于 2023 年 12 月 8 日参加了在迪拜举行的《联合国气候变化框架公约》第二十八届缔约方大会（COP28），与其他国际单位共同组织了主题为“林业新技术在基于自然的减缓气候变化方案中的作用研讨和经验交流”的边会。边会邀请了国际知名企业、组织、智库、高校、研究机构、NGO 等，展现了林业与自然解决方案作为应对气候变化战略的重要性，同时推进了青年教育和全球范围的知识交流。周教授和梅副教授分别作了题为：“我是吸碳王—竹林的吸碳固碳之路”和“基于综合环境效应的以竹代塑产品分级研究”的报告，汇报并宣传了中方任务 3 中的毛竹对气候变化的韧性研究成果和进展情况。

▲Task 3 Zhejiang Agriculture and Forestry University Research Team in COP28

Prof. Guomo ZHOU and Assoc. Prof. Tingting MEI attended the 28th Conference of the Parties (COP28) to the United Nations Framework Convention on Climate Change on December 8th, 2023 in Dubai, UAE, and co-hosted a side event entitled with *Global Knowledge Exchange and New Skills of Nature-based Solutions (NbS) about Forestry Power to Mitigate Climate Change*, with a mission to demonstrate the role of forestry and NbS in climate change mitigation and to establish a global collaboration network among different organizations. The international well-known companies, organizations, think tanks, universities, research institutes, and NGOs were invited to present the importance of forest and NbS as the strategic approaches to climate change and facilitate the youth education and knowledge exchanges worldwide. Prof. ZHOU and Assoc. Prof. MEI delivered their presentations entitled *King of Carbon Sequestration: From Professional to Public for Bamboo Forest Carbon* and *Grading for Bamboo Products Used as a Substitute for Plastic Based on an Integrated Environmental Effect*, respectively, and have shared and disseminated the research results and progress on the Task 3 of the eco2adapt-China Project.

任务 1 北京大学研究团队成员参加生态与气候变化暑校

博士生程中倩于 2023 年 8 月参加了由东芬兰大学教授、eco2adapt 项目联络人 Frank Berninger 教授组织的暑校——生态与气候变化（Ecology and Climate Change）。学习内容采取课堂理论、现地参观和野外调查相结合的方式。学习了不同干扰对森林生态系统的影响，探究森林受到不同干扰后影响树木存活的关键因素，以及利用遥感及地理信息系统方法

生态与气候变化暑校
The summer school on Ecology and Climate Change

研究火干扰前后的森林生态系统变化。此次暑校融入了多重理论并邀请了芬兰森林企业以及欧洲林业研究所的相关人员对芬兰森林生态系统与干扰的研究情况进行了介绍，并要求学生采用先进的遥感和模型完成最终汇报任务，学习成效显著。

▲Task 1 Member from Peking University's Research Team Attends Summer School on Ecology and Climate Change

Ph.D. student Zhongqian CHENG participated in the summer school on Ecology and Climate Change in August 2023, organized by Prof. Frank Berninger of the University of Eastern Finland, who is also the liaison for the eco2adapt China-EU Project. The curriculum combined classroom theory with field visits and outdoor surveys. It covered the impacts of various disturbances on forest ecosystems, investigated the key factors affecting tree survival following different disturbances, and utilized remote sensing and Geographic Information System (GIS) methods to study changes in forest ecosystems before and after fire disturbances. This summer school integrated multiple theories and invited personnel from Finnish forestry companies and the European Forest Institute to introduce research on Finnish forest ecosystems and disturbances. Students were required to use advanced remote sensing and models for their final report tasks, resulting in significant learning outcomes.

任务 6 林科院科信所团队举办“林业适应行动的社会经济驱动与政策机制研究”学术活动

2023 年 9 月 26 日，任务 6 林科院科信所团队邀请德国弗莱堡大学海因里希•施皮克尔教授开展学术交流，并作题为“森林恢复和气候变化——中欧森林历史教训”的学术报告。科信所 40 余名科研人员和研究生参加了学术报告会。

施皮克尔教授作学术报告
Prof. Spiecker was giving presentation at the seminar

交流会上，施皮克尔教授介绍了中欧森林发展所经历的开发、恢复和转化三个阶段，强调了森林恢复中的树种选择以及森林恢复后的结果及风险，指出近自然多目标森林经营是提升森林生态系统韧性，应对生态、经济、社会、技术等不断变化的有效手段，对当前中国森林经营与生态恢复提供了有益借鉴。项目成员就近自然育林的生态经济影响、目标树技术体系的适用性、木材生产与生态系统服务的权衡、森林可持续经营与近自然育林的关系等方面展开了热烈讨论。

▲Task 6 RIFPI Research Team Held a Seminar on Socio-economic Driving Forces of Adaptive Forest Management and Policy Scheme

Task 6 organized a seminar on Sept 26th, 2023. Prof. Heinrich Spiecker from University of Freiburg, was invited to the Research Institute of Forestry Policy and Information (RIFPI), CAF for an academic exchange, and he gave a presentation titled *Forest Restoration and Climate Change: Lessons Learned from Forest History in Central Europe*. More than 40 researchers and graduate students from RIFPI participated in the seminar.

During his presentation, Prof. Spiecker introduced three phases of forest history in Central Europe, including forest exploitation, restoration and conversion, emphasizing the selection of tree species in forest restoration and the outcomes and risks of forest restoration, and it was pointed out that multi-purpose close-to-nature forest management is an effective way to enhance the resilience of forest ecosystems and respond to the continuous changes in

ecology, economy, society, technology, and other aspects. This provides useful references for the current forest management and ecological restoration in China. The Task 6 team members engaged in lively discussions on the ecological and economic impacts of close-to-nature forest management, the applicability of the technology system of crop tree management, the trade-offs between wood production and ecosystem services, and the relationship between sustainable forest management and close-to-nature forestry.

欧盟提议全面开展森林监测以提高欧洲森林韧性

欧盟许多森林状况不佳。森林生物多样性丧失，气候变化影响严重，加剧了虫害、污染和病害带来的破坏。这些变化正对森林稳定性和生产力造成越来越大的损害，与此同时对森林产品和服务的需求也在增长。加强森林监测，有利于采取行动，提高森林抵御因气候变化而加剧的害虫、干旱和野火的威胁，推进碳农业等新商业模式发展，提高森林环境、社会、经济、碳汇等多重功能。然而，森林状况和利用森林资源及服务的相关数据信息缺乏且不完整。要解决这个问题，需要构建系统全面的森林监测体系。在此背景下，欧盟委员会于 2023 年 11 月 22 日提交《森林监测法》提案，旨在填补欧洲森林信息领域的现有差距，建立一个全面的森林本体知识库，帮助欧盟各国更好地应对森林面临的日益增长的压力，提高森林韧性。该法案将建立森林监测框架以收集和分享最新、可比较的森林数据，建立系统综合的森林治理体系，并支持森林经营者提供森林生态系统服务以获得经济效益。该提案将支持《森林、土地利用和土地利用变化法案》、《栖息地和鸟类指令》、《欧盟无毁林法案》等其他欧盟法律的执行。欧洲议会和理事会将根据普通立法程序审议提案。

▲EU Proposes Comprehensive Monitoring to Improve European Forests Resilience

Many forests in the EU are not in a good state. They are suffering from biodiversity loss and are heavily affected by climate change, aggravating and cumulating other destructive pressures such as pests, pollution and disease. The changes are taking a mounting toll on forest stability and productivity, while in parallel, the demand for forest products and services is growing. Better monitoring will enable action to make forests more resistant to the cross-border threats of pests, droughts and wildfires that are exacerbated by climate change, enable new business models such as carbon farming, and ultimately strengthen the capacity of forests to fulfil their multiple environmental and socio-economic functions, including their role as natural carbon sinks.However, currently available information on the state of forests and the use of forest resources and services is scattered and incomplete. A comprehensive monitoring system will address those inconsistencies.

In this sense, the EU Commission is proposing a *Forest Monitoring Law* on 22nd Nov, 2023, which will plug existing gaps in the information on European forests and create a comprehensive forest knowledge base, to allow Member States to improve their response to growing pressures on forests and strengthen forest resilience. The Law is aimed at building the monitoring framework to enable the collection and sharing of timely and comparable forest data, help to create an integrated forest governance among state members, and support forest managers to market forest ecosystem services for economic benefits. The proposal will support the implementation of other key legislation, such as the *LULUCF Regulation, Habitats and Birds Directives, Deforestation Regulation,* as well as the *Nature Restoration Law* once adopted by the co-legislators. The proposal will be examined by the European Parliament and the Council under the ordinary legislative procedure.

《欧洲森林病虫害数据库：DEFID2》，全球变化生物学，2023 年 11 月，DOI: 10.1111/gcb.16912

森林病虫害作为林业生产中极具破坏性的生物自然灾害，是影响森林健康的主要因素之一，对森林生态系统的稳定性和可持续性造成了不利影响。随着气候变暖，环境污染加剧，森林病虫害在全球各地频繁发生，森林生态系统的固碳能力、水土保持、木材生产和生物多样性等日益受到损害。过去的几十年里，欧洲的森林病虫害次数显著增加，亟需评估病虫害对森林生态系统的影响，但还没有大规模、详细的数据库记录欧洲范围内的病虫害对森林的干扰。在此背景下，来自佛罗伦萨大学的 Forzieri 教授等基于遥感技术及地面调查等数据构建了欧洲森林病虫害数据库（DEFID2）。DEFID2 收集了以多边形或点的形式绘制的超过 65 万份地理参考记录，记录了 1963 年至 2021 年期间在欧洲八个不同的国家的森林中发生的病虫害。

DEFID2 通过一组定性属性描述了不同病虫害的严重程度和模式、病原体、宿主树种、气候驱动的触发因素、造林做法以及最终的卫生干预措施等信息。此外，基于长时间序列 Landsat 影像，选取归一化燃烧比（Normalized Burn Ratio, NBR）指数，计算受病虫害干扰森林区域的 NBR 时间序列的卫星定量特征，使用 LandTrendr 算法得到病虫害的相关指标（包括扰动的起始年份、持续时间、扰动强度和扰动率）。同时 DEFID2 还考虑了病虫害与风倒和火灾可能发生的相互作用，进一步补充了病虫害发生前后是否受到已知风倒或火灾事件的影响。DEFID2 数据库为大尺度的森林扰动应用提供了一个重要的基准，有助于提高对景观尺度森林扰动下的生态过程的理解，为监测森林扰动在空间和时间上的演变以及在陆地气候模型中模拟它们的动态提供了数据支撑。

▲ *The Database of European Forest Insect and Disease Disturbances: DEFID2.* Global Change Biology, Nov 2023 (DOI: 10.1111/gcb.16912)

Forest pests and diseases, as extremely destructive biological natural disasters in forestry production, are one of the main factors affecting forest health and have adverse effects on the stability and sustainability of forest ecosystems. As the climate warms and environmental pollution intensifies, forest diseases and insect pests occur frequently around the world, and the carbon sequestration capacity, soil and water conservation, timber production and biodiversity of forest ecosystems are increasingly damaged. The number of forest pests and diseases have increased significantly in Europe over the past few decades and there is an urgent need to assess their impact on forest ecosystems. However, there is no large-scale, detailed database documenting the disturbance of forest pests and diseases on a European scale. In this sense, Professor Forzieri from the University of Florence and other researchers constructed the new Database of European Forest Insect and Disease Disturbances (DEFID2) based on remote sensing techniques and ground surveys data. DEFID2 comprises over 650,000 harmonized georeferenced records, mapped as polygons or points, of insects and disease disturbances that occurred between 1963 and 2021 in European forests and these records currently span eight different countries.

The records in DEFID2 are described by a set of qualitative attributes, including severity and patterns of damage symptoms, agents, host tree species, climate-driven trigger factors, silvicultural practices, and eventual sanitary interventions. In addition, based on the long-time series of Landsat images, the Normalized Burn Ratio (NBR) index was selected to calculate the satellite quantitative characteristics of the NBR time series of the affected forest areas, and the LandTrendr spectral-temporal segmentation algorithm was used to obtain relevant indicators of pests and diseases (including disturbance starting year,

duration, magnitude and rate of the disturbance). At the same time, DEFID2 also considers the possible interactions between forest pests and diseases and windthrow and wildfire, and further supplements whether the pests and diseases are affected by known wind damage or fire events before and after the occurrence. The DEFID2 database provides a significant benchmark for large-scale application dealing with forest disturbance, helps improve the understanding of landscape-scale ecological processes underlying forest disturbances, and provides a basis for monitoring the evolution of forest disturbances in space and time and for simulating their dynamics in land-climate models.

《以增强森林韧性为目标的森林干扰优先管理措施：文献分析与林业专家、林业政策和经济学认知的比较分析》，林业政策与经济，2024 年 1 月，DOI:10.1016/j.forpol.2023.1031193

气候变化改变了森林经营的作业环境。当前，森林韧性亟待提高，且迫切需要利用现有先进知识指导森林经营。然而，并不清楚林业经营实践指导需要何种程度的科学知识支持。鉴于此，Nikinmaa 等学者采用文献分析方法，分析了森林经营措施应对干扰影响成效的相关文献，针对欧洲林业专家开展了两轮半结构访谈，了解他们如何看待最佳森林经营措施增强森林应对干扰的韧性，以及在促进研究与实践相结合的过程中存在哪些障碍。研究者使用 MAXQDA 软件对文献分析结果和访谈结果进行了归纳分析。结果显示，科学文献中常讨论的森林经营措施与林业专家倾向采用的有效措施之间存在差异。林业专家普遍认为能有效增强森林韧性的重要措施鲜有研究，这表明以应用为目标的科学研究能更好地促进实践工作。此外，林业专家认为，有关促进科学措施实际应用的信息缺乏以及专业能力不足是阻碍科学知识与森林经营实践工作相结合的主要因素。因此，有必要通过提升林业经营指导能力，促进研究成果更好地服务森林经营作业。

▲ *The Priorities in Managing Forest Disturbances to Enhance Forest Resilience: A Comparison of a Literature Analysis and Perceptions of Forest Professionals*, Forest Policy and Economics, Jan 2024 (DOI:10.1016/j.forpol.2023.1031193)

Climate change alters the operational environment of forest management. The need to increase forest resilience and manage forests based on the best available knowledge is urgent. However, it is unclear to what extent scientific knowledge is integrated into practical forest management guidance. To explore how the integration of research works in forest management guidance, we reviewed literature on the effects of forest management measures on disturbance impacts and conducted two rounds of semi-structured interviews with European forest professionals, on what they perceive to be the best forest management measures to increase resilience to forest disturbances, and on the barriers they perceive in integrating research into practice. Both literature review results and interviews were analysed inductively with MAXQDA software coding. We found a discrepancy between forest management measures frequently addressed in scientific literature and those favored by forest professionals. Some measures that forest managers broadly perceive as important for increasing resilience to disturbances are scarcely studied, indicating that the science-practice interphase could benefit from more application relevant research. The lack of relevant information that could facilitate the practical application of measures and the lack of professional capacity were seen by forest professionals to be the main barriers in integrating research findings into forest management. The results showed that there is a need to support the integration of research findings into practice by increasing the capacities for providing forest management guidance.

Eco2adapt 欧方项目首度年会在希腊阿斯塔科斯举行

2023 年 7 月 10–13 日 eco2adapt 欧方项目首度年会在希腊埃托洛卡纳尼亚州的阿斯塔科斯举行，会议由雅典农业大学林业和自然环境管理系与西罗梅罗市政府合作组织，来自全球 23 所大学和研究中心的 60 名教授、研究人员和研究生参加了会议。

会议主办方在 7 月 11 日组织与会者实地考察了雅典农业大学林业和自然环境系的实验区。实验区位于西罗梅罗具有独特林牧系统的天然林中。通过走访这片天然林，与会者不仅领略了该地区的自然环境，更加深了对自然环境与社会、宗教和科学关系的了解。

会议还邀请了社会、宗教和科学相关的利益方代表参会，针对森林和森林管理及其对环境和整个区域的贡献提出他们的看法和意见。

1st Annual Meeting of the Eco2adapt Project Took Place in Astakos, Greece

The 1st annual meeting of the eco2adapt Project was held between July 10th-13th, 2023, funded by the EU HORIZON EUROPE programme, took place in Astakos, Aetoloakarnania.The meeting was organized by the Department of Forestry and Natural Environment Management of the Agricultural University of Athens in collaboration with the Municipality of Xiromero. 60 professors, researchers, and postgraduate students from 23 international universities and research centers participated in the meeting. The attendants had the opportunity to enjoy the natural environment of the region and to visit the experimental sites of the Department of Forestry and Natural Environment, Agricultural University of Athens, funded by the project. The experimental sites are established in the unique old-growth forest and silvopastoral system of Xeromero. The field trip was organized on the 11th of July giving the participants the opportunity to visit several parts of the forest. The field visit was organizing on three important aspects: the relation of the natural environment to i. society, ii. religion and iii. science. Stakeholder representatives of these aspects were invited and presented their view and opinion on the forest, its management and contribution to the environment and the region in general.

与会者参与 eco2adapt 欧方项目的第一次年会
Participants of the 1st annual meeting of the eco2adapt project
Source: eco2adapt EU Project newsletter S2

欧方项目“生活实验室”（下）

Living Labs in EU (Part B)

Living Lab: 德国弗莱堡市城市森林 温带阔叶林，位于西欧

研究背景：弗莱堡市拥有德国最大社区林之一，其城市森林以欧洲山毛榉、花旗松、挪威云杉、栎树等为主要树种。市林业局根据森林管理委员会（FSC）认证的标准来管理森林。近年来风暴频发，干旱强度增加，导致主要树木死亡和地下水位下降。

预期成效：结合利益相关方及社会各领域关切点，基于气候变化及相关风险开发生态经济模拟系统，分析弗莱堡森林社会生态系统韧性。基于对生态系统服务的社会需求的考虑，采用最先进的森林模拟工具，评估所有替代管理方案，建立具有韧性的生态系统，同时也要考虑到工具固有的风险和不确定性。

Living Lab: 德国图林根高地森林 温带阔叶林，位于西欧高海拔地区

研究背景：图林根森林主要由挪威云杉和山毛榉组成，其次还包括枫树、无梗橡树等。气候变化导致树皮甲虫虫害严重,威胁着森林的水土保持、生物多样性等等生态功能。

预期成效：设计、推广、实施和评价新的森林可持续经营方法，包括开发出不依赖特定质量木材的新产品链。该实验区将成为德国甚至其他欧洲国家的森林经营模板。

Living Lab: 西班牙莱达索尔松斯县 位于地中海地区

研究背景：土地利用变化和气候变化引起的非生物和生物干扰，如火灾、极端干旱事件等，对土壤保护、水资源管理、木材和非木质林产品生产和森林旅游等构成了威胁。

预期成效：研究干扰机制的变化（以及不同干扰之间的相互作用）如何影响森林生态系统服务供给，确定适当的经营策略，提高生态系统的韧性和适应能力（包括在树种组成、森林脆弱性和干扰后响应等方面的变化）。

Living Lab: City Forest Freiburg

Western European broadleaf forests, Temperate

Expected Results

To develop ecological economic modeling system that analyses the resilience of the entire social-ecological system in Freiburg. Consider inherent risks and uncertainty in adopting the state of the art process base forest simulations tools. These tools will be used to evaluate all alternative management options to establish resilient ecosystems and take into account the social demands for ecosystem services including mitigation and socio-economic values.

Living Lab: Thuringian upland forest

Located at high altitudes in Western Europe, broad-leaf forests, Temperate

Expected Results

To Design, promotion, implementation and evaluation of novel sustainable forest management options. This comprises also the development of new product chains that are independent of specific timber qualities. The living lab could become a template for other forest regions in Germany but also in other European countries that experience similar problems

Living Lab: Solsones county – Lleida - Spain

Mediterranean

Expected Results

Further study how the changes in the disturbance regimes (and interactions among different disturbances) may impact forest ES provision and to define adequate management strategies aimed at improving the resilience and adaptive capacity of theses systems (including changes on composition, on forest vulnerability and post-disturbance response).

欧方项目“生活实验室”（下）

Living Labs in EU (Part B)

Living Lab: 希腊西罗梅罗
位于爱琴海和土耳其西部，硬叶林和混交林

研究背景：希腊西部埃图罗卡纳尼亚省西罗梅罗地区的瓦洛尼亚橡树林以国有林为主，包含部分私有土地。气候变化增加了干旱、热浪、火灾和风暴的风险，引发爆发树皮甲虫虫害，同时全球贸易加速生物入侵，农林复合系统韧性降低。

预期成效：降低森林火灾风险因素，提高公众对风险的认识；提出森林管理政策措施的建议；针对森林保护、管理和建模等工具制定提出建议；开发森林可持续管理战略；建立森林火灾预警及灾害监测，利用创新技术快速响应灾情；提高森林生态系统对气候变化的应对能力，制定气候缓解措施。

Living Lab: Xeromero

Aegean and Western Turkey *sclerophyllous* and mixed forests

Expected Results

Reduction of forest fire risk factors, raising public awareness for the risks; Recommendations for forest management policies and measures; Production of recommendations-tools for forest protection, management and modelling; Sustainable forest management strategies; Forest fires fast detection, reliable spread monitoring, and quick & efficient response using innovative technologies; Increase readiness of this ecosystems on climate change and preparedness on climate mitigation measure.

Xeromero 天然林和林牧系统
The Xeromero old-growth forest and silvopastoral system
Source: eco2adapt EU Project newsletter S2

阿斯塔科斯，希腊
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